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AUSTRALIAN PUBLICATION

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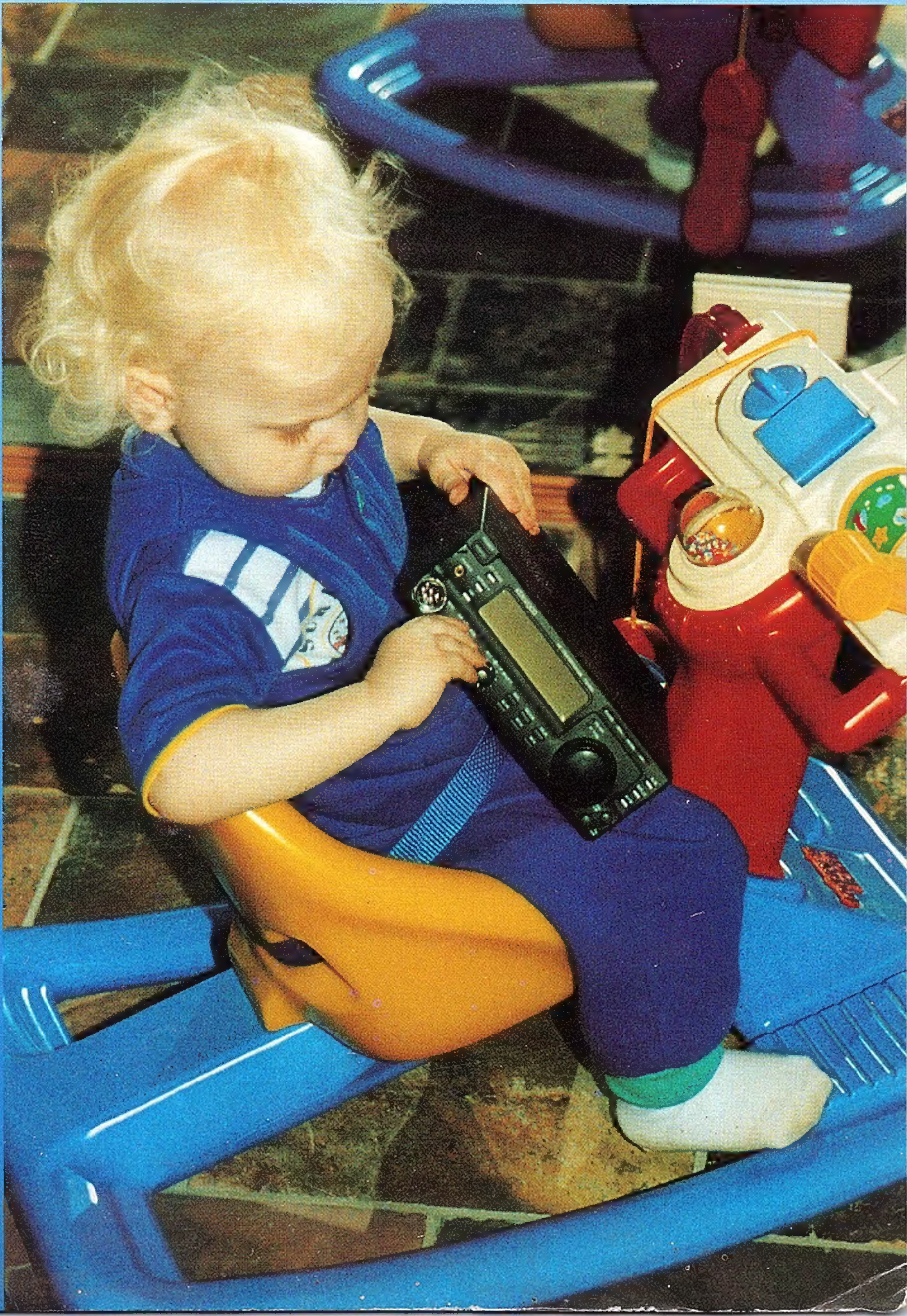
— *compact child's play!*



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Volume 16, Number 3 **On Sale: 6 July, 1993**

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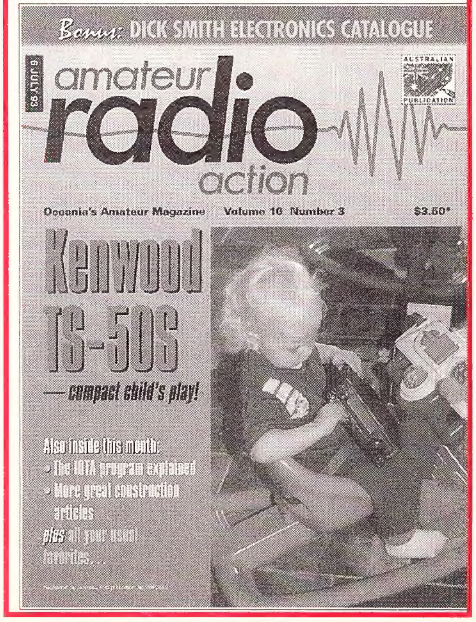
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6 JULY 93
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Kenwood TS-50S
— compact child's play!
Also inside this month:
• The IOTA program explained
• More great construction articles
plus all your usual favorites...

NEXT MONTH:

More simple do-it-yourself circuit ideas, a look at ***PacTOR*** *equipment with an explanation of how the mode works, a full review of the new* ***Yaesu FRG-100*** *communications receiver — and your chance to win one ! Stay tuned!*

Cover: Here's Junior Deputy Assistant Editor **Stephen Edmondson** giving the new Kenwood TS-50S the once over in his 'mobile' station. When we pulled the first one out of its box a few months ago several people burst into laughter. "It's a child's toy!" one exploded. Believe us, this great new rig is no toy, despite its cutesy looks! It may come in a little box, but it sure packs a big, quality signal...

Next issue out August 3. Reserve your copy today!

amateur radio action

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Newsletter editors and publishers please take note!

QSP

I cannot adequately describe the quantity of egg which has decorated not only the faces but other body parts as well of certain people in the *Syme Magazines* Melbourne head office since the last issue of this magazine was dispatched to stores around the country without the heavily-advertised Dick Smith Electronics catalogue attached.

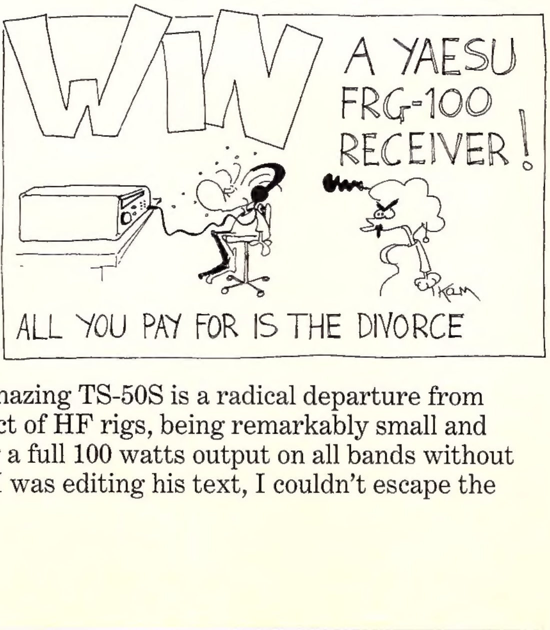
As I no longer work full-time from the office (hang on, I'll explain shortly) I had no inkling that anything untoward may have happened, but it seemed that industrial action had prevented the many thousands of magazines from being delivered after printing to the outside contractor whose job it was to wrap the magazine and catalogue together — and the person whose job it was to *know* and to do something about it simply wasn't told about it because of the strike. It was quite a big strike, if that's any consolation! Melbourne's *The Age* newspaper, and many of the other newspapers and magazines we publish, were severely disrupted. In fact, they were put right off the rails for 24 hours.

Of course, it wasn't until three or four days after printing — by which time the magazines had well and truly left the distribution machinery and were on their way interstate and overseas — that the contractor rang the company's production manager to politely inquire when the magazines might be delivered so that he might package and move all those catalogues… "Uh oh. Haven't you got them? I mean, *had* them and *done* them and *sent* them? Gulp."

So they rang *me*, didn't they, and they said "We suspect you might get an extra phone call or two and perhaps a letter or three — but if it helps, it isn't your fault." Oh gee, thanks. Thanks a heap fellas. You owe me a new battery for the phone. Why do *I* always get the blame?!!

We apologise wholeheartedly to both you, the reader, and to you, Dick Smith Electronics for the stuff-up of the decade. In the meantime, the goodies in the attached (by God it had better be this time!) catalogue beckon. But I'd better warn you: you can spend *hours* reading through it, so I hope you have plenty of time at hand!

Given last month's stuff-up, it seems Dick Smith Electronics' generosity knows no bounds. In the next two issues you will have the chance to win a great new Yaesu FRG-100 communications receiver worth just one buck under a grand. I put the newcomer briefly through its paces before sending it off to our shortwave specialist Craig Seager for next month's review, and he returned it more than a week late… with his order to buy one attached! You don't need a licence to enter our competition, just a keen eye for detail. So make sure you read the review — carefully — then out with the pen and send off your entry coupon. Good luck…


WIN
A YAESU FRG-100 RECEIVER!
ALL YOU PAY FOR IS THE DIVORCE

This month we present a full review of the amazing new Kenwood TS-50S HF transceiver which we brought you in a world-first scoop, including photos, several months ago. We were the first people outside Kenwood itself to touch and use this radio. The amazing TS-50S is a radical departure from what we've come to expect of HF rigs, being remarkably small and compact, yet still offering a full 100 watts output on all bands without cooking itself. But while I was editing his text, I couldn't escape the impression that reviewer Neil Duncan was mentally comparing the new radio to the current crop of $2000+ transceivers, which is a very great compliment to the newcomer indeed.

You see, other than a vox, the new TS-50S has all of the commonly-used features built in, and a lot of things you simply don't get in many other comparable transceivers — but its recommended retail is actually $1589, making it Kenwood's new entry-level HF rig! This radio replaces the former TS-140S, which was with us for quite a few years, and it's hard not to draw a few simple comparisons: the TS-50S' cubic volume would be... oh about 20 per cent of its forebear, I guess, although it's not significantly lighter. But it offers *far* more features than the old radio — including AM and FM as standard — and has a really excellent general coverage receiver to boot.

But probably the most telling factor was the one fact Neil couldn't bring himself to put in the report for fear of offending other equipment manufacturers: in his testing Neil was constantly asked what on *earth* he was running, for the audio was *sooo* pure and so *smooooth.*

Neil's regular Sunday morning sked with Tom Moffat, VK7TM, is where he usually unveils new rigs and gets opinions about signal quality. You have to hear these two at it to believe what goes on! You can tell they've been yakking for years, for they talk in abbreviations and quarter-overs. There's no point trying to join in, either, as it's simply to hard to keep up with them. When discussing equipment, they talk in very fine amounts indeed, and Tom can always tell when even the very smallest change has been made. Tom didn't need to be told that something was different about the signal this time either. When asked what he was using, Neil as usual hedged a bit (my reviewers aren't allowed to identify on air what they're using!) and had poor old Tom guessing about how many new $5000 to 10,000 rigs were poised to hit the market.

But audio content isn't the only criterion by which to judge a radio, although a good report always helps a lot. Read VK3ND's review and decide for yourself...

Neil's opening comments in the TS-50's review certainly got me thinking. He was talking about how things have been miniaturised over the years, and suggested that it was in the sphere of amateur radio where the greatest amount of down-sizing appeared to have taken place.

Well gee, Neil, I don't know that I can agree with you on that one. In a world where man is now able to make machines so small that you need an electron microscope to see them (no kidding!) there are a *lot* of things getting a whole lot smaller than just amateur VHF/UHF rigs.

Here's an example. In my left hand I am easily holding four pieces of equipment: the very impressive yet-to-be-released Yaesu FT-530 dual-band hand-held (I'll tell you more about this great forthcoming rig shortly), a tiny pocket-sized cellular telephone, a domestic cordless telephone half the size of any I've seen before it, and a true miracle of modern technology, the new Icom GP-22 GPS receiver. Between them, the four weigh less than a kilogram, and each is a real pace-setter in its own way.

Perhaps it isn't exactly in the realm of 'amateur radio', but we're soon going to take a much closer look at the cellular phone — both the analogue and new digital networks — because their technology is truly fascinating. Same thing goes for Icom's GPS receiver. This thing's fabulous for anyone wanting to put their exact latitude, longitude and altitude on their QSL cards! But, I should tell you from the outset, it's not yet technology which comes cheaply... Nonetheless, we'll take a close look at it in these pages very soon.

Something else we're about to examine in greater depth is the venerable pocket pager — more to the point, those dreaded pocket pager *transmitters.* City-dwelling two metre operators despise these things, so we're going to find out once and for all whether you should blame the equipment at one end or the other for the undesirable interaction between the services. Although the amount of RF floating around this country's many pager transmitter sites is quite surprising in its quantity, it appears more and more that today's very sensitive two metre receivers simply can't cut the mustard in the immediate presence of large amounts of RF so close to our band.

Perhaps it's timely to point out that this is a uniquely Australian problem. As I understand it, no other major country has pocket pager transmitters anywhere near the two metre band, and I'd very much doubt that our minuscule market is significant enough for the major Japanese manufacturers to set to work to help us find a cure. So modern transceivers are equipped with increasingly-sensitive receivers which simply do not have sufficient isolation from 148-150 MHz to prevent interaction.

Nonetheless, keep watching for our eagerly-awaited cook's tour...

Well, it's out with the old and in with the new this month. At the end of June we waved goodbye to the DoTC we've been dealing with and talking about for years. In its place we now have the Spectrum Management Agency, which promises a more efficient approach to... well, spectrum management.

The SMA is charged with making users of the spectrum pay for their use of the resource in this country. As yet we've had no approach of any kind from anybody to explain what the new body is or does, but the sceptics among you will surely know — it is, after all, a government department. Oh well.

While on matters regulatory, it's time to once again pause to wonder what might be happening with our long-overdue new regulations. You know, if the former DoTC hadn't taken the extraordinary step of putting the proposed document before us for our comments, most of us wouldn't have even known that change was in the wind!

It was immediately after our publishing of the proposed regulations that the government decided to

☞ over...

establish the SMA. As I hear it, everything else was put on the back-burner to allow for the smoothest-possible transition from the old to the new. I guess the dust should now settle and matters such as ours might once again be given some serious consideration.

If there are any 'losers' from the delays, it is the surprising number of people who have sat and passed examinations in Regulations and Novice-level Theory. As things currently stand, of course, a Novice needs Morse Code. These people are waiting for the Limited Novice to be proclaimed, for which their two exams would be sufficient. For their sake I hope the wait is not too much longer…

Our recent series of articles by legal correspondent 'Judicious Rex' evidently sent a chill wind along certain corridors in Canberra. The articles deliberately set out to explain the scope of the relevant Acts of Parliament. He or she was explaining to us what is *possible* under the provisions of the law. That's not always the way the laws of the land are enforced, though. So, for example, while the law says it would be possible to require licences be held for receivers, that doesn't necessarily mean that the minister will tell the SMA to start issuing them!

Nonetheless, our January article forecast the need for vigilance by the WIA against possible regulatory limitations on the amateur service under the new Act. This warning has been borne out by the recent discussions between the department and the WIA wherein the WIA was reassured that the rigid constraints of type approval would *not* be imposed on the amateur service or on amateur equipment.

That news comes as a very great relief. You should be aware that to impose type approval on our service would spell the end of the amateur service as we know it. It would have turned us exclusively into 'appliance operators' and would doubtless have eroded our standing as well as destroying any incentive to learn by way of experimentation.

"Patience is a virtue," they told me a child. I'm told I didn't heed the advice, but one person who clearly learned that waiting can be far more rewarding than just ploughing ahead was Dick Smith, VK2DIK who, as part of a two-man crew, successfully crossed the continent from west to east in a hot air balloon — well, suspended *under* a hot air balloon, anyway.

Dick's attempt appeared fatally stalled after his opponent in the race to be first to make the crossing took off many days before Dick. That attempt was a failure after ice formed on the balloon in sufficient quantities to weigh it down and force a landing.

Amateur Radio Action congratulates Dick Smith on his epic achievement, and offers this piece of advice: when you want to try the first non-stop balloon flight to the USA west coast, make sure you take off over Canberra. There's enough hot air coming out of that joint to turbocharge your flight!

To those of you who have been trying to ring me at the phone number listed for the office, I should explain that I'm very hard to get hold of there as I no longer actually work at *Syme Magazines*. In fact, I left the company altogether in early April — I need a rest! — and asked the management if it would be prepared to let me stay on as the editor of this magazine in a purely contractual arrangement, getting help with the work.

You'll be pleased (or disappointed…) to learn that a modified version of my proposal was accepted by management, and for the time being at least I will continue to have an editorial involvement with this publication. The work load for the past several years has been very great, as ARA has always been a one-person title with additional responsibilities coming to the editor as publishing technology improved.

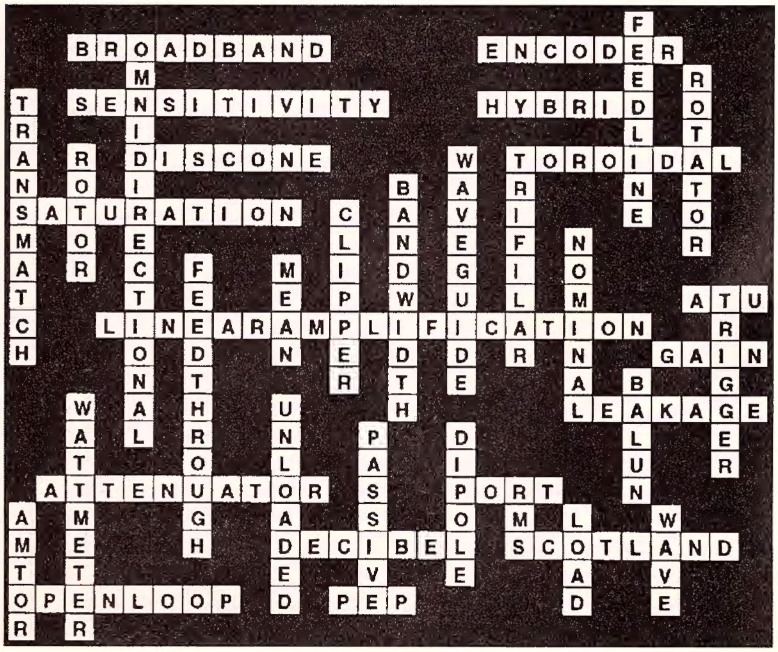
With the introduction of desktop publishing to the workplace a couple of years ago my workload virtually doubled overnight, and 80 or 100 hour working weeks became the rule rather than the exception. I'm sorry, but my health simply could not keep pace with the demands of the job, and I have been forced to make a lifestyle decision or face the nasty consequences. I have two young children… Already I am feeling *far* less stressed than I was some months ago and I look forward to doing a lot more writing in future.

The main release for me is that all desktop publishing and photograph scanning will be undertaken by my new partner in this venture: former managing editor Len Shaw, who quickly learned that he despised retirement, almost begging to do the work!

You can write to me direct at PO Box 1, Yarra Road Post Office, Wonga Park 3115, or you can ring me most times on (018) 35 3599. I look forward to hearing from you.

Best regards until next time from Chris Edmondson, VK3CE, editor.

Solution to last month's crossword



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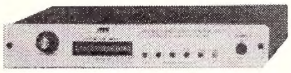

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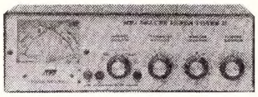

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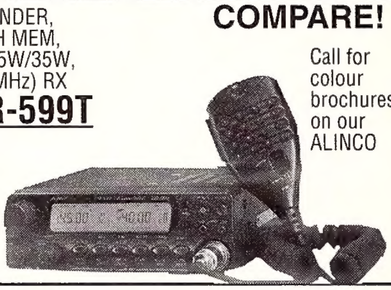

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NEWS DESK

Readers' contributions invited

Write to GPO Box 628E, Melbourne 3001

No type approvals!

Well, we can all breathe a sigh of relief. It's true — and it's not a Newsdesk rumor, either… According to a report in the July issue of the WIA's member journal, *Amateur Radio*…

"Amateur equipment will be exempt from type approval under the new standards and compliance framework of the Radiocommunications Act 1992, according to advice received from Roger Smith, First Assistant Secretary of DoTC's Radiocommunication Division.

"This exclusion has been made because of the experimental nature of the activity pursued by radio amateurs. It is also consistent with the approach taken in other countries, such as Europe." (Funny. When did 'Europe' become a country?)

"We will request that Standards Australia make generic standards covering all radiocommunications equipment. These generic standards will be based on international standards (where they exist).

"Amateur radio equipment would be required to conform to the requirements of mandatory generic standards."

Crikey…

Newsdesk informant caught cat-napping…

When one of Newsdesk's highly-placed spies (based at an un-named DSE location) procured a pre-release copy of the new Dick Smith Electronics catalogue and blabbed to us, he or she pointed out a seemingly-glaring omission from the latest catalogue, and this we duly reported in last month's column.

Well, folks, the truth is out: our person on the inside was *wrong* — fast asleep with brain completely disengaged! But the joke is on *you*, dear readers. Not one single one of you noticed Newsdesk's error, therefore no-one won the grand-prize — this writer's salary for a whole month! *(Maybe because no-one reads your column, Newsdesk! Ed.)*

Contrary to the tissue of lies, printed in last month's column, there WAS mention of the Radio Amateur's revered tome, the 'ARRL Handbook for Radio Amateurs'. Clear as daylight, it's there on page 197.

Our spy has been dealt with in the appropriate fashion — trust me, you don't want to know how — and this writer is able to spend said income on a new pair of spectacles — and will use the rest to buy a nice, big slice of humble pie. It also helps no end that Newsdesk hides behind a veil of anonymity.

At least, Newsdesk doesn't feel nearly as nauseous as the poor guy from the distribution department who left the catalogue out of out last month's issue in the first place. That person was last seen paddling in the general direction of Paraguay in an inflatable raft aptly named 'Self Pity'. Pithy stuff, eh?

25th anniversary convention for Wagga…

Wagga Waggan radio-hamsters, and assorted interested parties, will be pleased to learn that Wagga^2 Amateur Radio Club (is *that* what WARC stands for?) is to hold its 25th convention over the weekend of August 14 and 15 — yes folks, two days of boot-fulls of bargains and bust!

For more info, drop WARC a line at PO Box 294, Wagga^2 2650 — or drift into their net on 3.605 MHz (Tuesdays 2030k) or on 7.165 MHz (Sundays, noon).

(This info courtesy 'Smoke Signals'.)

NEWS DESK

The Spectrum Management Agency hierarchy...

From the DoTC newsletter *'Transcommunications'* comes the following:

The SMA will be established on 1 July as a separate Commonwealth agency within the Transport and Communications portfolio. It will be headed by a statutory officer called the Spectrum Manager with the powers of a Departmental Secretary. Staff will be employed under the Public Service Act.

The SMA will be headquartered in... Canberra... and have a regional presence. The new organisation will be responsible for the planning, operational and regulatory functions that are required for the effective management of the radiofrequency (new word now entered into Newsdesk's new dictionary) spectrum.

These responsibilities will include preparation of the spectrum band plan and frequency band plans, licensing, pricing and regulation of spectrum use ... with users having the right to use the spectrum more freely than is currently possible... It (the SMA) will take a more 'hands off' approach to spectrum management, including compliance and customer services.'

Now THAT'S a novel idea — hands-off customer services from a Government department?!! Newsdesk hereby declares that it wants dibs on 5 to 10 MHz, and 40 to 500 MHz... You guys can fight over the rest, or pay special STD rates on OUR part of the spectrum.

FCC proposes extended Novice frequencies...

From *73 Amateur Radio Today*, we learn that the FCC has proposed several changes in the 222 and 1240 MHz amateur bands. Novices are to have full use of the 222 to 225 MHz band and access to the 1270 to 1295 MHz section of the 23cm band.

Aussie software makes the big time...

It's pleasing to see a piece of software that the ARA crew have spoken so highly of achieving international recognition. Tony Lonsdale, VK2DHU, author of paKet 5, a very popular packet radio program here in VK now has an international audience. *Digital Radio Systems Inc* of Florida, USA, is now including a copy of paKet 5.1 with each of its DPK-2 and DPK-9600 TNCs.

This is what it says in its documentation:

"Should you decide to use this terminal program we urge you to remit the requisite registration fee to Mr Lonsdale and thus be in the database for future updates and improvements. It is only fair for the author to be compensated for his efforts in providing to the amateur community, through the shareware system, an excellent software package. With this encouragement he will hopefully continue to improve the software as hardware for digital communications continues to evolve."

Congratulations Tony! It's nice to know that someone appreciates your efforts!

Port Macquarie Field Day...

The Oxley Region Amateur Radio Club had something going for it this year when it held its field day over the Queen's Birthday long weekend: the climate! It was a heck of a lot warmer in Port Macquarie than it was in Mount Gambier — or in Melbourne for that matter!

Held over the Saturday and Sunday at the Wauchope Showground, the field day event provided a great opportunity to get amongst the bargains and to get amongst a few old, and new, friends as well. A very sociable bunch this lot. With free coffee and tea available all day, a pleasant roast dinner on Saturday night and a barbecue lunch on Sunday, visitors were left with little motivation for fox-hunting or radio throwing!

Sadly, this may be the last two-day version of the field day. With the possibility that the holiday for the Queens birthday may go the way of all things in this presently republican atmosphere. Maybe we should start an anti-republican movement with field day preservation as its central theme?

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NEWS DESK

DRSI keeps on going

Digital Radio Systems Inc has released two needed TNCs for a packet-hungry amateur world! For those needing a genuine TNC-2 clone-type TNC (for ROSE or NET/ROM or whatever) there's the new DPK-2 which offers very low power consumption in a small package for up to 1200 baud use.

For the speed demons there's the DPK-9600, a 4800, 9600 and 19,200 bps TNC-2 compatible TNC with up to 38,400 bps terminal data rates. This unit is, again, very small, with what seems to be a very elegant two-chip realisation of the modem allowing the TNC to fit in the same small box as the DPK-2.

More details from your friendly packet 'headquarters' at Stewart Electronics.

Are you playing PacTOR?

How many of our readers are playing with the latest HF digital sensation, PacTOR? By all accounts just about everybody who tries PacTOR falls in love with it! So how about putting up your hands and letting us know what you are doing and how you are getting on. We would also appreciate any comments you have about PacTOR equipment. ARA presently has three PacTOR systems in for review, so look for our first review in the next issue.

While we're on the subject, *Stewart Day* from Stewart Electronics has asked us to let you know that the PacTOR upgrades for the MFJ-1278 multi-mode data controller are still a month or so away. MFJ's local agent has been deluged with inquiries for this product in the last few weeks, but don't expect to see stock 'til early August.

How many TNCs?

The other day we were pondering just how many packet TNCs and multi-mode data controllers there are in the hands of Australian amateurs. Well, if we can believe what the importers tell us, it looks like the total count for amateurs and listeners is somewhere around an astonishing 6,000 units. And this doesn't include commercial sales! With an active amateur population of well less than 15,000 we have once again proven that Australians take to high technology with a vengeance!

The packet equipment importers also tell us that acceptance of new equipment happens much faster here than it does in the US. It seems that, just as they did with microwave ovens and color televisions, Australians are very keen to get into anything new! Americans, on the other hand, tend not to want to buy anything new until it has been around for four to six months.

According to some importers this phenomenon has an interesting twist. We get good supplies of new products early on which then dry up as the market in the US and Europe starts to accept the product.

Prices have gone up!

Just as we predicted there have been some recent price rises in amateur equipment. Whilst the restraint shown by just about every importer is commendable it has become obvious over recent months that something would have to give. Our most recent currency slide against the Japanese Yen and the US Dollar, coupled with a poor short- to medium-term outlook for the value of the Australian Dollar has meant that many importers have had to give in to significant pressure to increase prices.

Once source we spoke to this week said profit margins had become "...very marginal..." (pun was totally intentional!) "...if not non-existent! So we really had no choice."

At the same time a careful evaluation of the prices in this country reveals that in fact we pay very reasonable prices, bearing in mind the full impact of freight, customs and other handling charges.

By the way, the amateur dealer in this country generally has a much lower profit margin than the dealer in other countries, particularly the US and Japan.

49 states to go!

Driving to every US state — with amateur radio as a guide

By Geoff Clancy, VK3DNJ
Bairnsdale, Victoria

In March 1991, **Geoff Clancy, VK3DNJ** and potential amateur **Scott Parker**, both of Victoria, embarked on a daring journey of the USA. Their plan: to travel through all 50 states meeting amateurs along the way while using amateur radio as the means of communication.

"Thanks for the hospitality, Jay. We should be back in a few months," I said as we parted company at Visalia, California, site of the DX convention. Here we were, on our own at last, with a huge country to conquer. Armed with a Kenwood TS-430S HF rig and two metre mobile, we were equipped for the onslaught. **49 states to go**!!

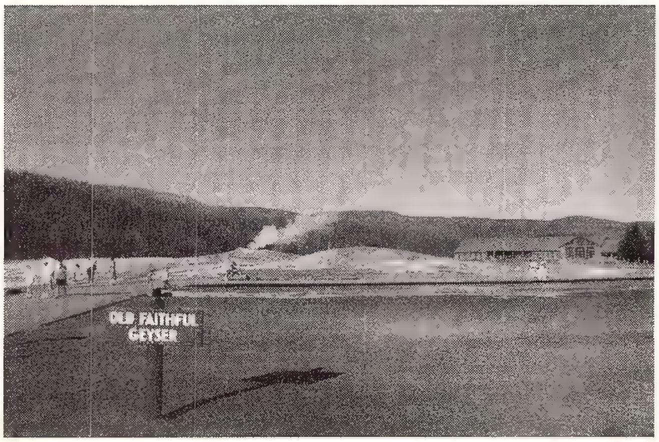
Trips like this start out as a dream and ours was no exception...

In the beginning

Planning a trip of this magnitude requires a few necessary ingredients, namely time, money and foresight to see a goal at the conclusion. Well, we had plenty of time, not a lot of money, but were driven by the burning desire to travel the United States. It was also important that amateur radio be used as a basis for the trip.

Twelve months before departing I set out to make as many contacts across this vast land with the intention of possibly visiting it. This proved very useful in enabling us to cover so much territory. At the forefront of our thinking was the requirement of a reliable vehicle to get around with and store our mobile radio station.

So with these basic requirements in our mind and our bags packed, we boarded the plane at Tullamarine for the long haul to Honolulu, Hawaii.



Aloha from KH6

Honolulu was an *experience*.

Being the first time outside Australia for either of us meant it took a while to become accustomed to the surroundings. We were to visit Cliff, NH6GC but somehow missed him. This meant we would now stay in downtown Honolulu and allowed the chance to get on two metres. One small problem. Having brought a Yaesu FT-480R, we needed a source of DC...

How were we to get this? Needing wheels to cover the city we hired two mopeds which happened to have 12 volt batteries. A stroke of luck maybe?

Mobile around Honolulu, visiting the tourist sites as well as having two metres and making contacts. Two metres is very popular here with the ability of inter-island communication. Having toured around the island in a few days it was time to take the short four-hour flight to Los Angeles to meet Jay, K6UMB. Flying *Continental* meant that we had become accustomed to American hospitality.

The landing

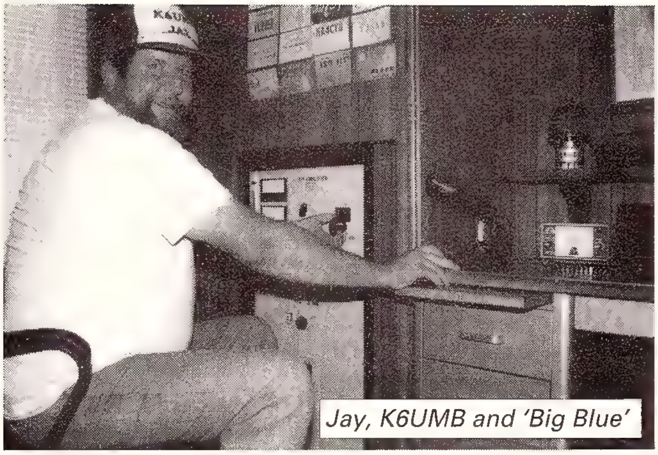
Having already organised to be picked up by Jay was a top idea. You can imagine landing at LAX at 9pm not knowing where to go or what to do. After the initial greetings, we were whisked away to Jay's QTH some 70 miles south-east of the airport at Lake Elsinore.

Now, I've known Jay for a number of years and always knew that he possessed one *heck* of a signal on 20 metres — and on arrival at his QTH and being ushered into his shack I found out just why. In the corner was a blue cabinet about the size of a small fridge. This was his home-brew amplifier capable of running the full US power limit with ease, and aptly named 'Big Blue'.

The exciter was a Kenwood TS-930S, and after a few minutes of familiarising myself with the operation of the station it was time to get on air running the 'full US gallon' as Jay described it. Scott was to be log-keeper and I operated under K6UMB (Ugly Male Bachelor).

Within 15 minutes of operating I was able to get a VK3 station to give my father, Lindsay VK3EIG a phone call and get him up on air. I am very grateful to Barry, VK3DKL for making the call. Within the next five minutes my father at Bairnsdale (270km east of Melbourne) had notified Des, VK3BSB and Nigel VK3FET and they were up on air. 59 reports were the norm. A perfect copy.

Jay had the powerful amplifier being fed to a 5-element monoband antenna some 70 feet in the air. Wow! *What* a station...


Jay, K6UMB and 'Big Blue'

Plans...

After the initial thrill of talking back home it was time to discuss our plans. Having already spoken to Jay about our automobile requirement we were pleased to know that he had already teed up another amateur to go out car-hunting tomorrow. Things were coming together.

The great car chase

The next day saw us rise early to be greeted by an amateur from Escondido, about 50 miles south of Lake Elsinore. Another Jay, W6FAY, was no softy when it came to driving a hard bargain as some of the car salesmen found out! Spending what seemed like *days* searching we finally settled on a seven-year-old Ford Escort coupe. We reasoned that this would give good fuel economy and appeared in good mechanical condition. It *had* to be because we still had 49 states to go!

Putting it all together

Arriving back at Jay's, K6UMB, we quickly fitted the car out with our gear. The FT-480 slotted right under the glove box with the whip on the gutter, while the TS-430 (which had been purchased from Red, W6AG) mounted in the rear of the vehicle. Quite a bit of metal bashing was required to mount the whip antenna for HF (courtesy of Leo, N6FCC) and necessitated the repositioning of the licence plate.

The next few days were used to evaluate how successful the mobile station would be. W6/VK3DNJ was found to work exceptionally well and surprised everyone with the reports from VK-land while driving around Lake Elsinore.

South of the border...

We decided to test our new mobile station by heading down to San Diego and crossing the border into Mexico. We had been warned about travelling in Mexico being hazardous due to graft and corruption being prevalent but decided it was a good opportunity to experience life 'south of the border'. Once the tense border area of Tijuana was behind us, we started to experience the *real* Mexico, with its laid-back lifestyle and friendly people. In no time at all we felt right at home. Having HF allowed nightly skeds back to VK to report on our travels.

Stopping by the side of the road near La Paz, on the Baja California Peninsula, we were planning to take a photo when a pick-up truck pulled up behind us. The first thing they mentioned was whether we were 'gringos'.

The next question sparked more interest:

"Are you hombres hams?" one asked.

I thought this was going to lead to some altercation but they then proceeded to introduce themselves as Felix, XE2RN and Bobby, XE2FRG who both hailed from La Paz. After quite some time talking, we exchanged QSL cards. It was again time to continue further south and arrive at Cabo San Lucas to catch the ferry to the Mexican mainland. On arrival at this point we were more than disappointed to find there was no ferry and that it had been out of service for some time.

Great!! *Now* what would we do?

Realising that we would have to retrace our steps back to the US border didn't go down well and also meant this was as far as the Mexican trip was to go.

Dining at Felix's

Having the QSL card from Felix, XE2RN meant that we could give a call on the local two metre repeater, back in La Paz. A few minutes later Felix was on, having been alerted by a friend who had heard us call and had been invited to his place for a brief visit. Once Felix saw how tired and weary we looked he offered us a chance to stay the night as well as dine with his family at the evening meal. Sitting down to a typical Mexican meal of chilli and tacos isn't exactly my idea of the ideal cuisine, even though it sure filled the spot.

I have to admit to being ignorant of Mexican cuisine but those innocent-looking yellow pieces on the tacos just about burnt my poor tongue off! I'll be watching out for that next time. A very enjoyable evening was spent talking about radio and other associated activities.

In the long run

Leaving Felix in the morning meant we should be able to get back to Lake Elsinore by evening. Being able to have regular skeds on 40 metres with Jay was a good idea as he was interested in our progress. It was also a chance to let him know if we had encountered any problems. Arriving back at Jay's that night we were literally exhausted. Our return drive had taken 16 hours, including a lengthy wait at the US border.

R and R

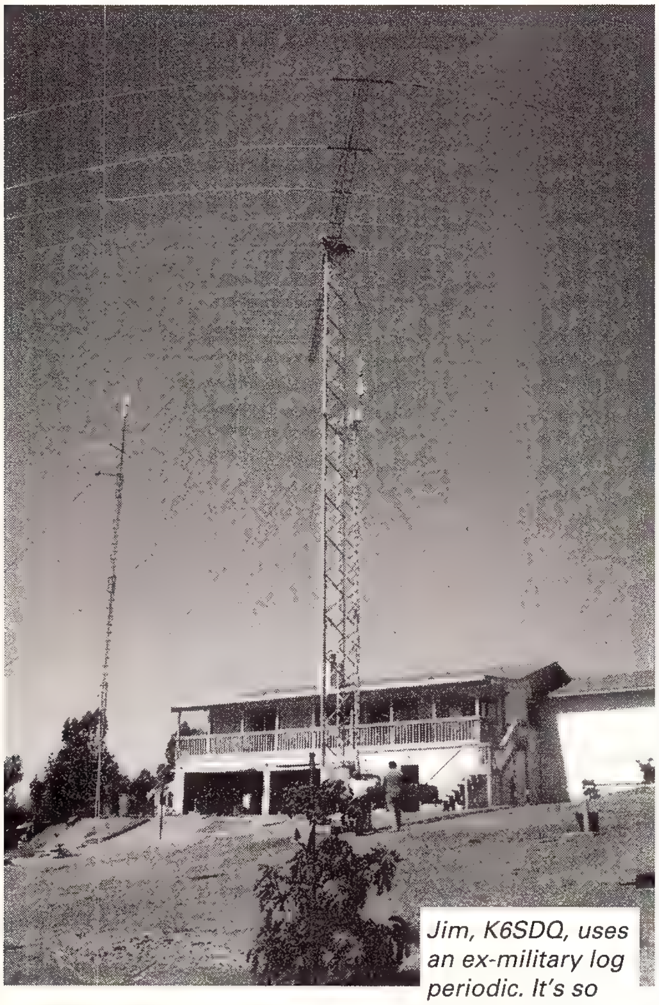
After a debrief and rest for a few days, in which the car was checked for any problems, we were now gearing ourselves for the big one — to cover *all* the states. We had agreed that because the Visalia DX convention was being held this weekend it would be a good starting point for the trip. In the meantime I had made a call to some other locals and had been invited over to Anza, 25 miles east of Jay's. George, N6GDS and Walt, K6PI are well known in DX circles and it was good to catch up with them. I had a problem contacting Seymour, W6CCP because he is the resident doctor at Anza and eventually had to make an appointment to visit him at his surgery!

It was really great to put faces to the call signs that I had spoken to over the years.

What about Don?

Next day saw us travelling up to Don's, K6IPV in Altadena. Don is a stockbroker by profession as well as being an accomplished singer and he certainly leads a hectic lifestyle. We were invited to attend a local radio club meeting and talk about amateur radio in Australia as well as meet many of the locals.

The next day was jam-packed with activities starting with a tour of Los Angeles' CBS Channel 2 TV station in Holly-



Jim, K6SDQ, uses an ex-military log periodic. It's so large he needs a hydraulic rotator to turn it!

wood by Paul, N6II, then a visit to NASA's Jet Propulsion Laboratories with a tour led by Gil, K6TOS (VK1YG). JPL is where deep-space tracking information is collected and analysed. A very interesting place indeed. This was then followed by a trek to the famous Hollywood sign. This location gave an exceptional view of the greater Los Angeles area.

After all of this travelling we still had one more place to visit. "The candy store," Don said.

The 'candy store' ended up being the local radio store and was called *Ham Radio Outlet* (HRO) and is probably the largest retail outlet specialising in amateur radio products in the USA. You name it, they've *got* it. Just walking into the store is an experience. You can just sense this place is an amateur's dream world. All the latest gear is on display and beckoning to be played with.

And what's more it's all connected and you can have an on air test. Great! Hence we spent quite a bit of time twiddling knobs and drooling over the latest gear. Finishing at a popular watering hole of Don's seemed a fitting end to a very hectic day.

The next day was spent visiting the Spruce Goose/Queen Mary and operating the radio station, W6RO. It was really good to activate this famous station and work a few on 40. We also managed a visit to Disneyland as well as Universal Studios. We now knew how it felt to be a *real* tourist with the long wait to purchase tickets.

In the meantime, Jay, K6UMB had been preparing to go to Visalia and, after talking to him on our sked frequency it was decided that we would join him at a local swap meet in Pasadena. We arranged to keep in contact with him on 40 metres while he was mobile heading up from Lake Elsinore.

Jay doesn't possess any two metre gear when mobile but sure makes up for it on HF running a whopping 1kW Metron amp excited by a Kenwood TS-130 in his Toyota pick-up (they say they do things *big* in Southern California!!). I can vouch for hearing his mobile signal back in VK and it's often as strong as many base stations.

Saying our goodbyes to Don and heading over to Pasadena to rendezvous with Jay at the swap meet/flea market we couldn't believe how many people were there. It seemed as if every person in LA had an interest in radio! There must have been *thousands* of them, and they all seemed to have a handie-talkie on their belts as well as wearing caps (we're still not sure if they are actually *born* with these!).

After spending a few hours at the event and meeting again with Jay, it was time to head toward Visalia, 150 miles further north. Many contacts were made in transit and it appeared that we were creating much interest in our quest to travel the country.

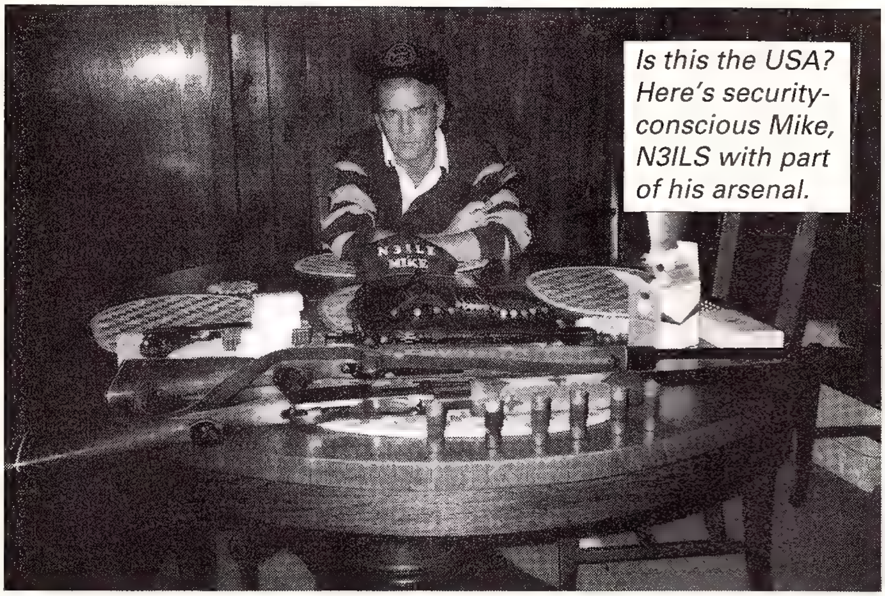
Visalia

American amateurs regard the Visalia DX convention as the be-all and end-all of DX gatherings. I had the privilege of meeting quite a few well-known operators from around the world including Lloyd, W6KG and Iris Colvin, W6QL as well as Martti Laine, OH2BH. It was a great day and the evening meal, incorporating the award night, was very well presented. These Yanks sure know how to wine and dine in *style*. Being in Visalia also gave us the opportunity to make more contacts for possible places to visit in the future.

Going our own way

Now was the time to leave Jay as he had to go back to work. Saying farewell felt kind of strange because it now meant that we were actually starting out by ourselves on the journey. Having met Duane, W6REC at Visalia we had arranged to stay at his place for a few days at Galt, near Sacramento. Spending a few days at Duane's and being escorted around the local area also allowed us to compose ourselves for the run into San Francisco.

Being able to talk into the Bay area of 'Frisco' proved a great help and we were invited to spend some time at Dick's, K6LRN QTH in San Raphael some 15 miles north of the Golden Gate bridge. Dick was able to give us valuable information about San Francisco as well as how to survive



Is this the USA? Here's security-conscious Mike, N3ILS with part of his arsenal.

earthquakes!! His house had suffered some damage from the major earthquake which rocked San Francisco a few years earlier.

Driving across the Golden Gate bridge is definitely an experience not to be missed. There's just so much traffic it's unbelievable. Once in the downtown area, sites visited included Fishermans Wharf, Alcatraz Island and a tour down Lombard Street, claimed to be the 'crookedest' street in the world!!

Another point to mention is that San Francisco is not the place for vehicles with faulty brakes. The streets are so steep it was nearly impossible to stop the car running back. Be warned!!

After spending a few days at Dick's and seeing all that 'Frisco' had to offer it was time to head over to Reno, Nevada and sample the delight of the 'biggest little town'. As can be expected, gambling and specialty shops were the order of the day.

Travelling through Nevada's barren desert landscape led to Utah with more of the same scenery. Salt Lake City is the capital of Utah and is also the capital of the Mormon religion. Wyoming, with its cowboy image, had Yellowstone National Park and a chance to view the famous geyser, Old Faithful.

Rocky Mountain high...

Colorado with the famous Rocky Mountains proved to be spectacular with a surrounding of snow capped peaks.

Fort Collins is at the foot of the Rockies and is home to the standard frequency and time signal service, WWV and was well worth the visit.

On the road again

New Mexico, Oklahoma and Kansas brought forward crystal-clear nights and a chance to keep up the regular skeds back to VK.

Wichita, Kansas gave rise to the effects of twisters. A large tornado had wreaked havoc on the outskirts of the city only a few days before. You have to *be* there to feel the true impact of this catastrophic event. Houses were just pulverised.

The next stop on the agenda was St Louis, Missouri, site of the famous 630 feet tall Archway To The West, a mammoth structure, with a backdrop of the Mississippi River and paddle steamer Robert E Lee. It was a great opportunity to appreciate this idyllic setting.

Getting the blues

Continuing south led to Memphis, Tennessee and our next contact Jim, KA4HOG. We had already spoken on 40 and he guided us to his QTH on two metres. We were then directed to notable tourist attractions like Gracelands with all the Elvis memorabilia and Beale Street, recognised as the birth place of Blues music.

After a few days with Jim it was time to continue through the forests of trees in Arkansas and onto the Lone Star State, Texas, for a tour of Dallas. Seeing all the sites of Dallas proved to be a breeze because there seemed to be very little traffic in the CBD. The site of the assassination of JFK and Reunion Tower proving to be the most notable landmarks.

Oil City

From Dallas it was on to Houston to catch up with Bill, N5NRJ. Bill lived on the outskirts of the city and gave us a 'Cook's tour' of this city which is renowned as being the oil capital of the world. It really is bigger than Texas!!

Houston then led on to the honkytonk city of New Orleans, Louisiana, and we then followed the Gulf of Mexico through Mississippi to Alabama. While in Mississippi, we visited the Stennis Space Center where earplugs were the primary requirement. Stennis Space Center is the test cell site for the rocket engines used in the space shuttle and is operated by NASA.

We then travelled back into Tennessee to visit the country music capital, Nashville, and spent some time touring the city.

W4 King Peter Queen

Then it was down to Breman, Georgia to visit a well-known 20 metre campaigner, Gerry, W4KPQ. After an introduction to farming, American-style, it was time to sit back and chat. It was great to listen to Gerry with his renowned southern accent and also to meet up with some of his friends who had been invited around to meet us. I've known Gerry for about 10 years and he certainly ranks as one of the characters on 20 metres.

After the brief visit it was on to Florida, where the vast wetlands seemed to stretch endlessly with occasional coastal scenery reminding us of home. Walt, K4IAM of Melbourne, Florida, had extended an invitation to visit some years ago when out in Australia and this was the ideal time to take him up on his offer.

A retired NASA physicist, Walt now spends his time operating a business which designs guided missiles. He had played a very active role in the lunar missions and was the perfect host for the tour of the John F Kennedy space museum at Cape Canaveral. 'The Cape', as it is called, proved to be another highlight but the planned viewing of the launch of the space shuttle was postponed due to inclement weather.

Watch for the conclusion of this story next month!

Kenwood TS-50S

a truly *mini* HF rig

By Neil Duncan, VK3ND
Heathmont, Victoria

Kenwood has stolen a march on its opposition with its incredibly small new HF transceiver, the TS-50S. It's been downsized by a factor of at least four, yet it still has all the bells and whistles, even if they are sometimes a bit harder to get at.

But has Kenwood made a blunder with its new radio? It's clearly been designed for use as a mobile transceiver, but it cannot be remote-controlled — that front panel is fixed firmly in place. And the optional auto antenna tuner is as big as the rig itself. Neil Duncan put the newcomer through its paces and came away impressed...

Miniaturisation must be one of the themes of the '90s. So many electronic gizmos now are smaller than ever. Take the latest home computers for example — they are certainly smaller than they were a few years back. Look at the size of a recent compact disk player, a mini-television set or even an inexpensive fax machine. But to me, it is within our hobby that some of the *most* noticeable shrinking processes have gone on. Some of the transceivers you can get are *really* small — but we've always been talking about VHF/UHF FM sets when talking small. Until now...

HF gear presents a slightly different story. One could be excused for thinking that top-end HF transceivers have become larger than ever over the past few years, and may even be still growing. So what has been holding up the manufacturers of HF gear from getting their miniaturisation act together too? Well nothing — at Kenwood at least, it already seems to have started.

Here on review, finally, is one of the new breed. It is easily the smallest all-band HF transceiver I have ever seen. It is no slouch in its specifications either. A keen receiver, a full-bodied 100 watts, 160 to 10 metres transmit capability and,

despite the size, it even comes with an 0.5 to 30 MHz general coverage receiver.

So who would want such a small set, does it work properly or is it some sort of compromise? Has it any advantages over its older brothers and sisters, the *amaterus radius guganticulii* of the past? Is it small enough or, perchance, is it simply *too* small? Let's find out the answers to those questions and some more too.

Will it fit in the car?

Despite its diminutive stature, the TS-50S is a little on the weighty side. It weighs fully 2.9 kg, which is quite hefty when you consider that its dimensions are a mere 179 X 60 X 233 mm. When you pick it up the word 'brick' comes to mind. It is about the size of a small antenna tuner, or a large FM transceiver for two metres. Roughly 10 of them would fit into the volume occupied by an Icom IC-781...

In truth, the TS-50S is rather uninspiring to look at — at first sight it just looks like a large car radio. It is dark grey in color except for the fine white lettering, tiny silver buttons and the clear perspex space for the LCD digital readout.

On the front panel there are five knobs (which look like three because two of them have concentric outer controls) and 19 mini-buttons, each of which gives a satisfying ker*lick* when you push it. Ergonomically, things couldn't be more simple. If at some time all you wanted to do was to tune with the VFO and adjust the volume control then you could definitely do so blindfold — or while in a mobile situation.

The TS-50S was obviously designed with the mobileer in mind. It runs from 12 volts, comes with a simple mobile mounting bracket, and also has a carry handle. Maybe I sound a bit ungrateful for all Kenwood's work, but I am not completely sure that Kenwood has actually shrunk this radio far enough. Avid readers may have noted an article a couple of issues back on installing a pair of *remote-control* rigs for a mobile situation. One rig is for VHF and UHF and the other is a 100 watt HF rig. You see, there was no room at all for a conventional FM rig, let alone a whacking great HF rig in the front section of my car, and a remote control scenario was the only option.

We selected the parts for this new mobile station before the TS-50 had been announced, far less hit the market, but I suspect the choices of rigs would have been the same. You see, the TS-50S is quite a bit larger than a car radio, so you can rule out any idea of putting it in that prime place in the dashboard. It also won't fit instead of your now-outmoded ashtray, so there goes another great idea. (In any case, who wants a 100 watt-dissipating heatsink with a fan blowing hot air buried in the back of their car's dash, heating or even melting precious wiring?)

So will the TS-50S fit in the normal places where HF mobile radios fit? Well, it could certainly go above the passenger's knees. It has the look of the nineties, with rounded corners and smoothed lines so it won't catch stockings, kilts or the like, but its top-mounted speaker will suffer a little, so an external speaker would be a must. Maybe it could drop vertically between the passenger and driver. Frankly, no — it is too tall for that.

Clearly, you must be able to find somewhere to put this little rig, but really, Mr Kenwood, I must say from the outset this one critical thing: WHY DIDN'T YOU GIVE THE TS-50S REMOTE CONTROL CAPABILITIES?

Now that I have that out of my system, let's go ahead and see how this, the smallest full-blown HF transceiver/general coverage receiver I have ever seen, performs.

Out of the box, on to the desk...

Even the cardboard box in which it arrived is unconventionally small. Unpacking the rig and setting the TS-50S on top of the current shack gear really made me take note of the size of the TS-50S. Would it *really* work? Can so small a rig make any real dent in the HF bands?

To find out, I started by plugging the chunky-looking DC lead into the DC bench supply. Hey, that DC connector looks familiar! *(It should, Neil. All 'big three' makers now use the same four-pin lead for HF DC supplies — and all wire them the same way. Well done! Now for the microphone connectors... Ed.)* Next, the coax connector was plugged into the appropriate socket on the uncluttered back panel and an earth wire secured under the neighboring terminal post. That just about fills the back panel (except for the speaker, ALC, relay and ATU cable sockets).

The microphone Kenwood supplies is interesting — it has four little buttons on it which can be programmed for any of many different functions. On with the 12 volt supply and now hold down the '**POWER**' on the TS-50S button long enough for the set to light up and put the word HELLO on the LCD display. Hmmm, so there is a friendly programmer living somewhere in the Kenwood Corporation, eh?

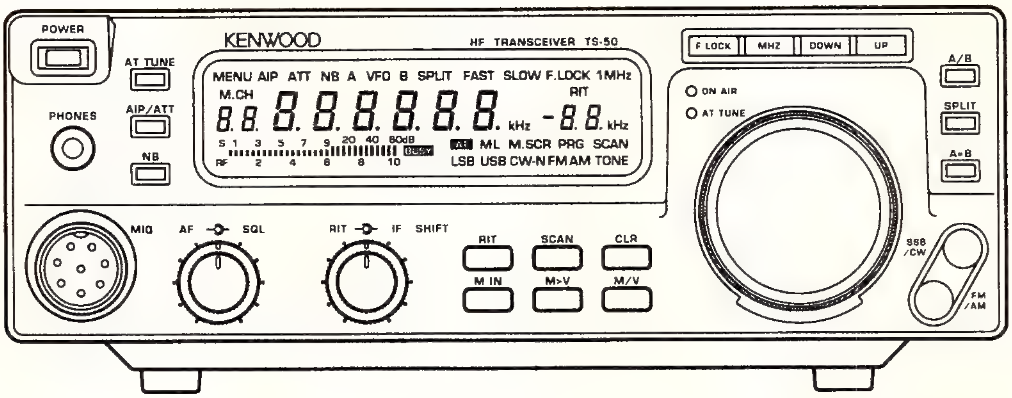
Now to some experimenting. First for the **VFO** knob. My first impression was that it is small and quite stiff to tune. You can fix part of that, anyway. Directly underneath is an adjusting device; push it one way and the VFO knob will freely spin for about two turns. It seems lightly weighted but remember, the knob is quite small. Push the adjuster to the right and the VFO knob feels like you are turning your hand around in a bag of sugar. Well, here is some thinking related to the mobile scenario again (no, Editor Chris, *not* the bag of sugar!): an average car couldn't *possibly* shake the VFO loose with that right-hand setting in place!

Next let's try the volume control. Well, not only is there heaps of audio but what I am hearing *sounds* just great too. Actually, it is REALLY good. Listening to a couple of old buffers reminiscing and dragging out a conversation on 40 metres quickly told me one thing — the receive audio on the TS-50S is natural and undistorted. Those two ops sounded like they were sitting right here in the room, musty old leather chairs and all. Listening on the broadcast band on AM (AM and FM are fitted as standard for both transmit and receive) confirmed this clarity exists in those modes too — although a 5 kHz AM bandwidth clouds this issue a little.

Now how do you change bands... oh, there they are, a couple of buttons marked **DOWN** and **UP**. Pressing them cycles you through the nine amateur bands (10 metres is sensibly split into two button pushes). I also note that the last-used frequency on the band you are leaving is preserved for when you return there later on, which is very handy. If you press the **MHz** button and then you use the DOWN and UP buttons, you move precisely 1 MHz at each push.

So what about memories: how many are there and what sort are they? The full conventional (and excellent) Kenwood system is in place in the TS-50S. A generous 100 memory system with a clear, **M.in**, **M>VFO** and **M/VFO** switching system is employed — and that is not bad for so small a set. In addition, 99 of them hold both the A and B VFO frequencies (yes, there are two VFOs) so FM, split frequency repeater operation is facilitated should you want that. Memory number 99 is designed to hold scan limits.

In truth, I am not big on scanning around the HF frequencies, but this facility *is* available should you want it. Scan-



ning works in conjunction with the squelch control and can be operated on the basis of carrier presence or a timer arrangement. You can either scan selected memories or you can scan between two presets. The speed of scanning can be user-set.

What else is available on the front panel? How about an **ATU** button with a matching '**AT TUNE**' LED? You need to purchase the sleek-looking but optional AT-50 auto tuner (or the AT-300 mobile tuner) before you can use that pair. There is an **AIP/ATT** button too. I have, in the past, (after using other Kenwood gear) figured out what they *do*. The AIP on/off facility effectively switches a pre-amp in and out, thus adjusting the 'Axial Intercept Point' and helping with any cross-modulation problems you may have. The **ATT** acts in place of the (missing) RF gain control. As you push this single button, you are cycled through the following settings — normal, AIP, ATT, AIP+ATT. That should keep you busy. To be honest, I didn't bother with this button much during my testing.

There is a **noise blanker** on/off button. This proved very useful and will probably spend much of its time in the on position... It kills spike noise and leaves a pretty clean signal in its place. Only a very strong signal seems to worry it. The **RIT** knob takes you a marginal 1.1 kHz in either direction and is a receive-only option. If you really want, a ±2.2 kHz setting can be organised. There is plenty of range in the **IF SHIFT** control however and this will prove to be a bonus for those who get stuck into DX-chasing or moving around in crowded bands and want to brush aside the QRM.

With respect to additional VFO control, there are three buttons. One switches between VFO A and VFO B and yes, the two VFOs can even be on different bands. The second button other copies the on-screen VFO into the hidden VFO and is labelled **A=B**. The third is labelled **SPLIT** and allows you to transmit on one VFO and receive on the other. That should be just the trick for FM repeater operation. Did I mention that FM comes as standard? It does.

Finally we have two **mode** buttons, found down at the lower right corner, offset and rounded in the mandatory 90s look which Kenwood seems to have adopted. Pushing one cycles you through USB, LSB and CW and announces your choice in CW.

I can't *tell* you how much I approve of announcements in CW! For a start it helps you brush up your CW and in addition it keeps you interested in the hobby if the bands are dead. Oh what a bummer — I just found that it can be disabled. By the way, I note that there is no automatic CW keyer residing in the TS-50S (not even as an option) but I can understand that, given its mobile bias. The other mode button cycles you through the AM or FM modes.

Transmitting

There is not much you have to do to get on air with the TS-50S. With so simple an operating system, not much can go wrong. With that in mind, I called CQ and got a reply from a ZL on 20 metres first up. Why was he 5x9 to me yet he was giving me a mere 5x5? Something was obviously wrong. After much delving through the manual I found that the TS-50S has three transmit power settings namely 10, 50 or 100 watts of output. The last user of the review rig had set it to 10 watts. *(Heh heh, an IQ test. Ed.)* Going through the special setup menu provided the solution. Back I went to 100 watts thus fixing that little problem — 5x9 for me too now.

After several contacts on that band, two things became obvious — the TS-50S transmitter puts out an outstandingly clear signal with plenty of punch. After a dozen contacts spanning several bands and all voice modes offered, I conclude this — the audio clarity from the TS-50S exceeds *anything* Kenwood has put this way for review and remember, I reckon Kenwood is top of the bunch in this respect. As supplied, the TS-50S is equally the best-sounding transceiver I have ever used — and I've used 'em all, right up to the most-expensive model of all — but there is a price to pay for it. I'll come back to that point in the 'grizzles' section.

On CW, things are up to scratch, too, but the use of an external power supply limits the quality of the signal. Nevertheless, the transmitted CW signal is very, very good. The TS-50S offers VOX operation for its CW (strangely, there is no VOX on the voice modes) and the delay can be preset to different times, right down to QSK speed if you wish. A side-tone system for the receiver offset is built in. You can be confident that your transit frequency will match that of the other station — there is a facility where this can be adjusted or even in a way reversed (using the other sideband in effect) but I found the latter to be a little too complex a procedure to muck around with if you are in a hurry, mid-QSO.

Operating the set on FM with 100 watts of output for prolonged periods warms things up and is probably not a very good idea. The heatsink on the TS-50S occupies almost half of the radio's volume and *more* than half of its weight. A cooling fan is buried in there somewhere and it is silent and unobtrusive. The thing gets quite warm, but heat never became a problem. Unlike many rigs, the heatsink sticks out the back only a couple of cm and does not inhibit putting plugs and the like in place.

Finally, a comment on the **SWR** protection scheme in place in this rig. If you get much above 2:1 SWR, the final transmit stage in the TS-50S shuts itself down progressively. To give you some idea of this, take the following scenario. When my ageing 40 metre trapped beam gets wet, the SWR goes up to 3:1. During typical Sydney weather last week (here in Melbourne) I connected the TS-50S up to the beam and wondered why I was only putting out a meagre five watts. Into circuit went one of **Emtron**'s very effective **EAT-300A** antenna tuners and within mere seconds I had smoothly and elegantly run the SWR down to 1:1.

In case you're not familiar with it, that particular tuner comes with an SWR bridge, dummy load and power-measuring facilities and represents Australian-made excellence in our hobby. No *wonder* so many of them have been sold. The TS-50S has no SWR-measuring capabilities of its own, so something like the EAT-300A will probably be a bonus to you. Once tuned up though, I had the full 100 watts of transmitter output heading up to the antenna again. Yep, that SWR protection facility really *works!* I confirmed the 100 watts in the specifications using the EAT-300A's dummy load, incidentally.

Resident intelligence

At first meeting, it is not really possible to appreciate how intelligent the little TS-50S is — probably because it is so little! Hiding under that innocent grey cover lies some pretty slick software and a whole heap of microprocessor concepts. I suppose when you get down to it, software and microprocessors are the way in which so much of the miniaturisation discussed above has been achieved. The TS-50S holds no exception to this and the degree to which microcomputing has played a part quickly becomes evident when you operate it.

The TS-50S is not the first rig in which several options can be set by a kind of programming. What you do here is to press the **F-lock** button for more than two seconds and soak in the world of programming which the TS-50S opens to you. Here are some of the selections you can make by using that facility in conjunction with the manual:

- TX power selection 100/50/10 watts
- LCD display brightness — 5 levels
- AGC speed
- IF filter selection (if you install options)
- Break-in QSK or VOX mode CW operation
- CW pitch 40 - 1000-Hz in 40 Hz steps
- CW reverse function
- Scan mode
- Beep or CW signal (on a button press) enable
- CTCSS tone setting for FM repeaters
- Peak meter hold
- AM tuning step size (9 or 10 kHz)
- RIT width
- PTT disable
- Microphone gain
- Carrier insertion point for SSB generation
- Microphone button function assignment

So *that* is how they reduced the front panel button/key count, eh? Such goodies as microphone gain are software-controlled and are accessed thorough special key-press sequences. Well that is fair enough — but I reckon that manual is going to be necessary from time to time if you intend to make frequent adjustments. I do concede, though, that the functions you can call up here are ones which you are not likely to use all that much.

And the list of automatic and clever features doesn't stop there either. Here are some more: There is a timer you can activate so that after 180 minutes the TS-50S will shut itself down (if no button has been used in the meantime). There is also the matter of the four programmable buttons on the microphone to consider. They can be set to perform any of 29 different functions. To name a few: ATU tune activation, AF mute, an extra accuracy display on the main dial readout and some memory or VFO manipulation.

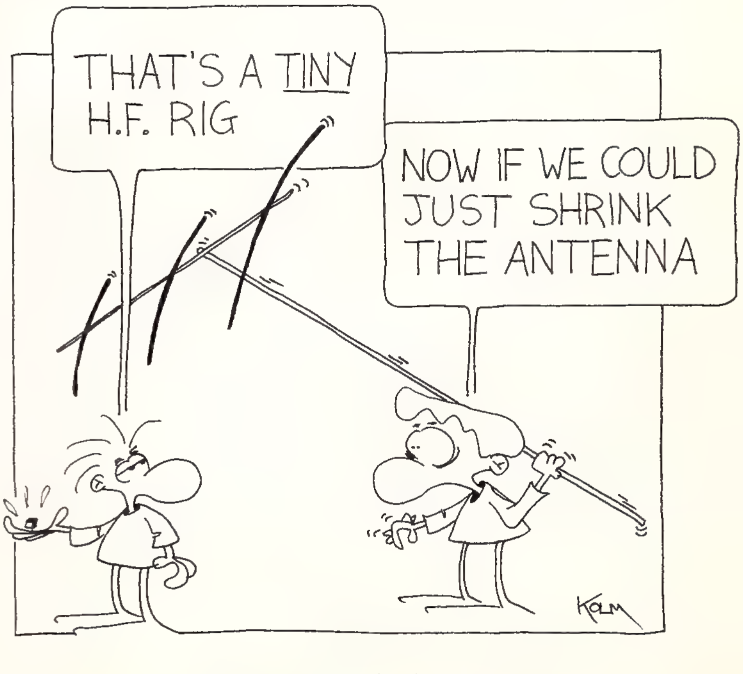
The frequency display is a slick, large LCD system with orange backlighting. On it, resolution to 100 Hz is provided with temporary resolution right down to 1Hz being possible with some button presses. Since the review rig was almost 1 kHz off correct calibration, I didn't see much point is using this facility. However, there's a clearly-defined procedure... and Kenwood even provides a special cable for setting the rig's master oscillator up against WWV or the like.

On the other hand...

I guess that no rig you are likely to meet will get away scot free with respect to 'complaints'. So then, what are the likely contenders for grizzles about the TS-50S? For some, it may be the lack of a continuously-variable power level control while for others the absence of some sort of ALC indication. In my case (wait for it) I just *love* to pick faults and I have found three. The two I have just described don't worry me at all and no, the 'not quite small enough' aspect of the TS-50S I talked about isn't one of the faults either. In any case, that is hardly a criticism with respect to its operation. *(I see its size — well, the lack of it — as one of this radio's strongest points. Congratulations on a truly magnificent achievement, Kenwood! Ed.)*

First and foremost for me is the matter of the **crystal filter** Kenwood has chosen to use. With the possible exception of a VFO system, the singularly most important part of the design of an SSB transceiver should be the filter. It is virtually the starting point when people say "let's design a an SSB rig". Why then, I ask, *why* was so *broad* a filter chosen for the TS-50S?

I will be precise here. Tune in a strong carrier (well over S9) and tune from its 'far left' to its 'far right'. On a super-dooper rig, as you tune you would hear audio starting at zero beat, rising in intensity rapidly and then stabilising in amplitude until say, a 2100 kHz note is reached, and then it should rapidly drop off again. That is basically the case here


THAT'S A TINY H.F. RIG
NOW IF WE COULD JUST SHRINK THE ANTENNA

but you can still hear some of the signal above there and also on the wrong side of zero beat. Hmmm, I am rather picky here — to hear this nastiness, the unwanted signal must be way over S9 and the resulting unwanted received signal ends up way down below S1 — but that is not the point.

Okay, they do have an optional second filter available for CW. But that still leaves us with a set with a less-than-optimum SSB filter for modern (crowded) band conditions. Actually there is good news and bad news associated with this. The bad news is that when VERY strong interference is nearby, you will hear some of it. The good news is that the transmit and receive audio quality are probably greatly enhanced by the extra filter width. The somewhat barn-door effect of the filter is responsible in part, for the hi-fi. I would immediately add that many other operators would no doubt say that the filter is perfectly adequate. It's just that I would have preferred it quite a bit tighter.

My second worry is that VOX operation is missing. I suppose it's the mobile scenario again that caused its absence or maybe room ran out, but I happen to like VOX.

My last complaint is about one aspect of the tuning system. It takes too long to travel from one end of the band to the other. Now there is some attempt to cater for that — the tuning rate (kHz per turn) is variable depending on the rate at which the VFO knob is turned. Kenwood calls it 'fuzzy logic' and it works quite well giving about 4 kHz per turn on the fast speed and 0.6 kHz on the slow — in SSB and CW modes. By gee though, it's *great* for CW and SSB! On FM, you can belt across the bands so maybe you can treat the FM button as a tuning speed button!

How good is it?

After spending a couple of weeks with the TS-50S, my main conclusion is that it is a superb performer, especially given its size. The receiver sensitivity is excellent, the 10 metre operation in particular being good. The set is quiet, free from spurious signals and has excellent frequency stability (although an optional high-stability master oscillator is available is you wish). I found the set extremely easy to get going in its basic modes of operation, and would recommend it to those who go for simplicity as much as for those who love things on a rig to fiddle with.

Is it fair to compare the TS-50S with rigs of a similar price bracket but which are twice its size? As an example, it is obvious that the TS-50S is a much more modern set than the **Yaesu FT-747**. That it offers 100 memories, IF shift and the FM mode as standard tells you that.

I prefer the VFO tuning knobs employed on the entry-level Icom sets over the one used on the TS-50S. On the other hand, I would rather have the simplicity but completeness of the memory system on the TS-50S to that employed on the Icoms. The need for an antenna tuning unit may be more apparent if you intend to use the TS-50S in a primarily mobile or portable mode, but that overbearing business of power reduction with SWR would eventually get to you. To be fair though, those rigs with a built-in antenna tuner are far more expensive and a lot larger than the TS-50S. That size issue keeps coming back, doesn't it! Let's face it, that is the real appeal of the TS-50S!

The manual supplied with this rig is outstanding, by the way — Kenwood manuals are in general. Add it to the things I like about the TS-50S.

Finally, while in comparison mode, I note the superb, robust construction of the TS-50S which includes extensive use of surface-mount technology. It has most certainly been built with durability in mind. The combination of small size with such durability, simplicity and hidden resources of power will prove very appealing to many in making a decision of which rig to buy. Make no mistake, either: heaps of people will use the TS-50S as a base station set, no doubt making full use of its compact nature.

I am a very great fan of the TS-50S and congratulate Kenwood on its design and implementation. Unfortunately, even as small as it is, it is still too big for my car and probably too small for my shack — go on, Chris, say something about my specs! *(No need, Neil. You already did! Ed.)* — but much of that decision is very definitely a matter of personal preference. In the below $1600 stakes, this set will prove an absolute winner for Kenwood.

Out with the magic reducing stick, Icom and Yaesu. Kenwood is one up on you both. The TS-50S is one small but powerful grey box.

***Editor's note**: I suspect that Neil has given this new transceiver an extra pat on the back without quite realising it. You have to remember that the TS-50S replaces the TS-140S, which was Kenwood's cheapest, entry-level HF transceiver. Can you name another entry-level HF amateur rig with FM as standard? In fact, this radio has many features thrown in as standard which are simply not available on other comparable rigs. This radio is an extraordinary step up from the TS-140S. Have no doubt about it — Kenwood will do very nicely indeed with this radio! Now for that remote-control front panel...*

SPECIFICATIONS

General	
Frequency range	
Receive:	500 kHz - 30.00 MHz
Transmit:	1.8 to 2.000 MHz 3.5 - 4.000 MHz 7.0 - 7.300 MHz 10.1 - 10.15 MHz 14.0 - 14.350 MHz 18.068 - 18.168 MHz 21.0 - 21.450 MHz 24.89 - 24.990 MHz 28.0 - 29.700 MHz
Frequency stability:	< 10 ppm Hz from -10° C to +50° C
Modes:	SSB, CW, AM, FM.
Antenna impedance:	50 ohms
Number of memory channels:	100
Useable temperature range:	-20° C to +60° C
Dimensions (WHD):	180 X 69 X 270 mm incl projections
Weight:	2.9 kg
Transmitter	
Power output:	10, 50 or 100W on SSB, CW or FM. 2.5, 12.5, 25 watts AM
Sideband carrier supp:	greater than 40 dB.
Frequency response:	400 to 2600 Hz.
Spurious emissions:	<-50 dB.
Carrier suppression:	>40 dB below peak output.
Unwanted sideband:	>40 dB below peak output
Microphone impedance:	600 ohms.
Receiver	
Type:	Triple conversion
IF frequencies:	73.045, 10.695 (and 455 kHz for FM)
Sensitivity:	typically less than 0.25 µV on the amateur bands at 10dB S+N/N ratio, SSB, CW & AM. less than 0.5 uV at 10dB S+N/N ratio, FM.
Audio out:	2.0 watts with 10% distortion into 8 ohms.
Bandwidths:	5.0 kHz (AM) or 2.2 kHz (SSB/CW) and 12 kHz (FM) with the supplied filters.
RIT:	±1.1 or 2.2 kHz max.
Price class:	$1550

MODIFICATIONS...

Improved UHF Receiver Coverage from the Yaesu FT-470 dual-band hand-held

not for the faint-hearted...

By Lew Whitbourn, VK2ZIP
Lindfield, NSW

The FT-470 has been around for quite a while now and has proven to be a very popular dual-band hand-held. Although the Dick Smith Electronics catalogue which accompanies this issue announces its replacement, we're told it could still be several months before the radio makes it to the showrooms. In the meantime, the many owners of FT-470s may want to know how to improve the UHF receiver performance above the 420 to 450 MHz amateur band.

I first became interested in the FT-470 when a friend bought one in the belief that it would double as a two metre/70cm transceiver as well as a reasonably respectable UHF scanner covering 430 to 500 MHz. I had advised him that it would do this quite well, based on a statement by ARA Editor Chris that the FT-470 UHF receiver was 'virtually flat' from 430 to 500 MHz (ARA Vol 14 No 4; August 1991). I believed that this was possible because Chris had said elsewhere that the FT-470 has a track-tuned front-end (ARA Vol 13 No 4; August 1990).

In fact *neither* of these statements was correct. Is your face red yet, Chris? *(You betcha, Lew — which is why I left this bit in! Consider me firmly rebuked. Ed.)*

I discovered this by measuring the sensitivity of the FT-470 at both VHF and UHF after making the necessary mods to give extended receiver coverage — 140 to 174 MHz VHF and 430 to 500 MHz UHF, as shown in **Figs 1** and **2** respectively. The VHF performance was no surprise — it is very similar to that of the original FT-411 (see AR January 1990). Both radios use a first IF of 17.3 MHz and switch from high-side to low-side local oscillator injection at 157 MHz.

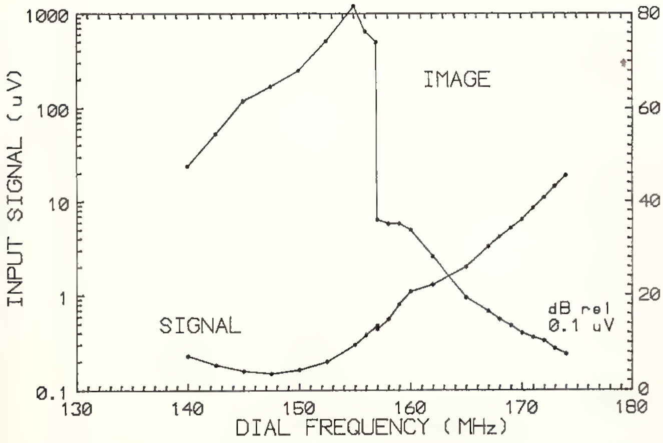


FIG. 1 FT-470 140-174 MHz VHF RECEIVER SENSITIVITY

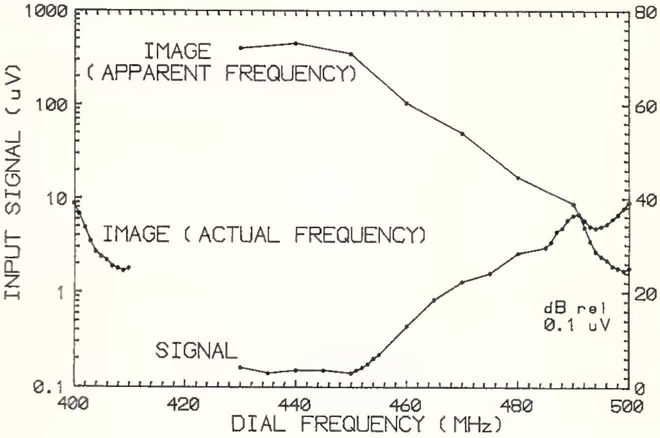


FIG. 2 FT-470 430-500 MHz UHF RECEIVER SENSITIVITY

As shown in **Fig 2**, the UHF receiver performance of an unmodified FT-470 was far from flat up to 500 MHz. Indeed its sensitivity around 470 MHz is already almost 20 dB worse than that in the 430-450 MHz amateur range of the receiver. I opened up the FT-470 to look for the three helical filters, labelled as a single unit CV2001 on the circuit diagram, with a view to doing a little tweaking! They were not visible. Eventually I found that, by separating two circuit boards inside the radio (which involved undoing additional screws, unplugging an internal multi-pin plug connecting the two boards as well as an additional 2-pin (probably power) plug and loosening the two top mounted control potentiometers) I could see CV2001, labelled CV01, on the bottom board of the FT-470, not too far from the antenna socket.

But my problems had only begun! This is the first radio that I have encountered, hand-held or otherwise, which does not allow adjustment of the receiver filters while operating. To do this with the FT-470 would require a special adaptor plug/socket combination. I almost gave up. It just seemed inconceivable to me, considering how much fiddling it can take to get the tuning right, to adjust, reassemble, test, disassemble and re-adjust, umpteen times, before finally getting an acceptable result.

But before giving up I decided to try something so stupidly simple that I normally wouldn't think of it. I must have been desperate — I *was* desperate — I didn't want to let my friend down but I didn't have three days to spend tuning his radio!

I knew that turning the helical filter adjusting screws anti-clockwise would raise the resonant frequencies of the filters. I marked the initial positions of the three screws and then carefully turned each screw one turn anti-clockwise. I then re-assembled the two boards and re-measured the frequency dependence of the sensitivity of the UHF receiver, as shown in **Fig 3**. Eureka, pay dirt in one step!

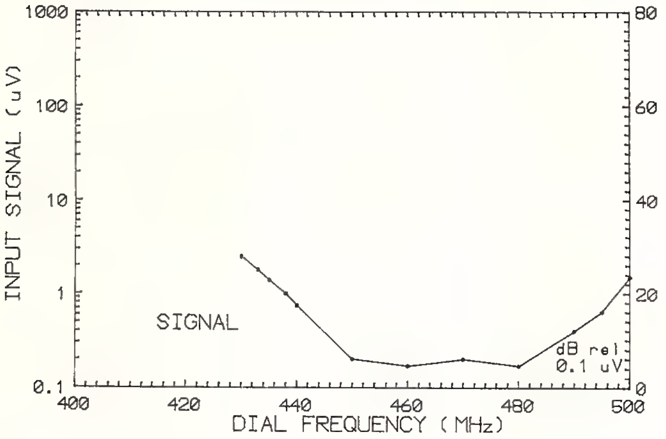


FIG. 3 UHF SENSITIVITY: ALL SLUGS 1 TURN OUT

The only thing was that I had gone a little too far. The receiver had a sensitivity of about 0.2 µV from 450 to 480 MHz but was slightly worse than 1 µV at 438 MHz, where the amateur repeater outputs are all situated. The sensitive range of the receiver had been moved 30 MHz upwards by the one turn adjustment and I decided that 25 MHz would have been enough, so I needed to go back about 5 MHz, ⅙th of 30 MHz, so I turned the three screws back in by ⅙th of a turn (60x), and got just the result I had hoped for — a sensitivity better than 1 µV at 438 MHz, which is useable for the 70 cm FM repeaters, a sensitivity of about 0.2 to 0.3 µV (for 12 dB of noise quieting) from 450 to 480 MHz, and still under 1 µV up to almost 500 MHz.

So there you have it. A vice transformed into a virtue! I would normally not recommend adjusting a receiver without the receiver operating and a signal generator connected. But here now is an adjustment that *anyone* could do without using a signal generator at all.

Not too much can go wrong. If something *does* go wrong it is only a matter of putting the three helical filters back to where they started.

The most important thing is to mark the filters carefully in the first place and keep notes of what you have done. Note that I am not asserting that the 'stupid' alignment procedure described above gives optimum tuning. Better results could almost certainly be obtained using a signal generator, or better still a UHF sweep generator etc. However, because the procedure described here does not necessarily peak the three helicals at exactly the same frequency it probably causes some beneficial broadbanding at the expense of ultimate sensitivity — which turns out to be just what is needed!

My friend's FT-470 has been serving him well, receiving from 438 to 500 MHz ever since. There is, not surprisingly, an increased susceptibility to overload resulting from shifting the most sensitive range of the receiver up into commercial territory, where there are lots of strong signals to contend with. Anyone doing this modification has to decide first that they are prepared to accept this penalty.

It would be the same with any other receiver. The FT-470 is actually one of the better ones. Its high first IF of 45.1 MHz helps keep image problems down to acceptable limits.

Caveats

The process of extending the UHF receiver coverage of the FT-470 occurs in two steps. The first, which I did not describe above, changes jumpers connected to its CPU to allow it to actually receive above 450 MHz. When this is done the transmit range is actually reduced from 430-450 MHz, to 430-440 MHz, which is okay for amateurs in Australia. The work involves very fine desoldering and soldering of 0-ohm chip resistors about 0.5 mm x 0.5 mm x 1 mm and removing the backup battery to allow access to these. I did not describe this work because:

a) it has been widely described on the packet bulletin boards;

b) I don't recommend that anyone other than the most hardened hackers should attempt it;

c) you can get it done at **Dick Smith Electronics**;

d) there is more recent information on the packet bulletin boards describing how the same result can be achieved through cunning keyboard tricks, which even enable receiving below 430 MHz — something even the hardware mod cannot do!

The second step could be attempted by less hardened hackers since it requires only 'screwdriver' adjustments. But it still requires patience and care so I would still only recommend it to those with some experience working with the modern miniature hand-helds. I described the essential parts of the job above. The potentiometer knobs have to be pulled off and a small Phillips-head screwdriver is required to open the radio. The hardest part of separating the two sandwiched circuit boards is the job of loosening the two potentiometer-retaining nuts.

This might be attempted with fine long-nose pliers but in the unit that I worked on the nuts were too tight. I had to make a special tool from a small length of brass rod about 10 cm diameter and 50 mm long. I first bored a 7 mm diameter hole, about 30 mm deep, into one end of this rod so that it became a tube that fitted over the potentiometer shafts.

I then filed the end of the tube to leave a couple of small square projections that match the two indentations in the potentiometer retaining nuts. The first try was unsuccessful, so I just filed the end of the tube flat and started again. The whole process took less than half an hour (but I did have access to a lathe for boring the hole...).

Adjustment of the slugs in the helical filters should be done carefully with a small aligning tool or a flat-bladed screwdriver which is a good fit along the whole length of the slot. The consequences of cracking the slugs are unthinkable, so care is required, but the slugs in the FT-470 are not at all difficult.

That's all there is to this mod. While I'm 'here' though, I feel compelled to say a few words about the software approach to extending receiver coverage, which can be obtained from various packet bulletin boards.

Software modifications

First note that extending or shifting the frequency range of any synthesised transceiver necessarily breaks down into three tasks, all independent and all equally-important, but best performed in the following order:

1) 'Liberating' the CPU so that it allows the desired frequencies to be keyed in. This is usually a hardware mod involving changes to a diode matrix or jumpers connected to the CPU. If this mod is successful the CPU not only displays the desired frequencies but also feeds the corresponding data to the divide-by-N circuits of the frequency synthesiser.

2) Ensuring that the range of the voltage controlled oscillator (VCO) in the synthesiser can cover the required frequency range. In some radios this involves a hardware mod. In others it may involve adjustment of an adjustable L or C in the VCO tuned circuit. In the FT-470 no such adjustment is required because the VCO range is already enormous.

3) Adjusting the receiver front-end to cover the desired receiving range. If appropriate (and legal) the transmitter final tuned circuits should also be adjusted at this point. This wouldn't be legal for the FT-470 but it would apply when modifying, for example, a 27 MHz CB radio to operate in the 28 MHz amateur band. In any case I should say that it is also not appropriate for the FT-470. Firstly, as far as I know, NOTHING on earth will allow 'liberation' of the FT-470 CPU to make it transmit outside the 430-450 MHz. *(Plenty of people have blown their CPUs trying! Ed.)* Secondly, the RF output circuitry is broadbanded and has no adjustments — this probably makes for easier manufacturing.

Now, back to the software mods. Like lots of radios, a stock-standard FT-470 will not receive above 450 MHz, even though, in principle, the display and divide-by-N circuitry will go higher. Presumably the firmware in the CPU looks at a frequency as it is keyed in and prevents it being entered into the VFO if it is outside the 430-450 MHz range.

However, you could imagine that if you could somehow get an 'illegal' frequency into the VFO, or into a memory channel, it would not be checked thereafter. This seems to be the case for the FT-470, for receiving if not for transmitting. The software mod involves pages of instructions describing special key sequences punctuated by switching the radio on and off after certain steps.

I have not tried this process, or studied the key sequences in enormous detail, but what seems to happen is this: other parts of the CPU firmware ensure that the radio shuts down 'tidily'. This is necessary to ensure that, no matter when it is turned off or gets a flat battery, it doesn't corrupt data in the VFOs or memories etc. So if you turn it off at the right point in a programming sequence — perhaps part of the way through the process of storing a frequency to memory — the shutdown software may take over and tidily store the frequency, 'forgetting' to check whether it is a 'legal' frequency. That seems to me to be what happens with the FT-470. I would welcome comments from anyone with different or additional thoughts on the subject.

Finally I should add that the amount of effort that hackers, mostly in the US, have poured into the FT-470, seems to be greater than for any other hand-held so far. This may be partly due to its enormous popularity but I suspect that it is also an indication of how IMPOSSIBLE it is to make the FT-470 transmit above 450 MHz! That is why I feel that there is no harm describing what can be done here. Happy hacking!

***Editor's note**: I need hardly add that anything you do inside your radio is your responsibility. Bust it at your expense! I remember being told as while back of a number of these radios all turning up in the Dick Smith service department with the same fault: CPUs where the internal smoke had leaked out. They tried to replace it the first time — the CPU, not the smoke! — and, when they totted the bill they realised that it was more than for a new radio. Crumbs.*

So experiment to your heart's delight by all means. We are amateurs after all... But just remember to avoid anything illegal — and try not to cost yourself a grand or so!

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EQUIPMENT REVIEW

rfconcepts VHF1-60

60 watts from your hand-held!

By Neil Duncan, VK3ND
Heathmont, Victoria

Given the vast numbers of hand-held two metre sets around these days, it is a wonder more companies haven't thought of this one - feed the output of your innocent little transceiver into a heavy, finned brick such as the one on we have here and *kerpow*, a full-blooded 60 watts of output will emerge at the other end.

The VHF1-60 will fill a definite need and is a concept created and built, appropriately, by **rf**concepts, a subsidiary of Kantronics which, in turn, you may associate with such goodies as the KAM TNC and other modems. The good people of **rf**concepts have responded to a need here and I guess many VHF1-60s will find their way into cars and amateur shacks as a consequence. Oh dear though, all those hand-helds burning holes in the band!

The design

The VHF1-60 carries a good level of automation with it. The changeover from transmit to receive for example, is all done for you. In essence, the VHF1-60 is invisible on receive and switches itself into circuit when you press the PTT button. That is, the antenna may just as well be connected to your receiver directly when the VHF1-60 is in circuit. On transmit, an RF sensor detects the incoming two metre signal and automatically switches the amplifier in-line. A maximum of eight watts is accepted by the VHF1-60 and it needs about one watt minimum.

The clever part of the RF sensing circuit is that if you are running a dual band rig and you transmit on 70 cm, the VHF1-60 will not go to transmit and the signal will reach the antenna unaffected. A two metre discriminator circuit buried inside the black box takes care of this.

The other really clever part of it is that just about *any* HT will work with this amp, irrespective of its power output. You'll get 60 watts out whether you're running 1 watt or 8!

Additional features of the VHF1-60 include a LED indicator to tell you if the VSWR being seen by the amplifier is too high, a full-bodied ALC system to progressively shut the amplifier down if the output VSWR is too high and an optional helical filter which can be installed if the extra output power causes any hassles with the RF neighbors. The helical filter stuffs your 70 cm chances however...

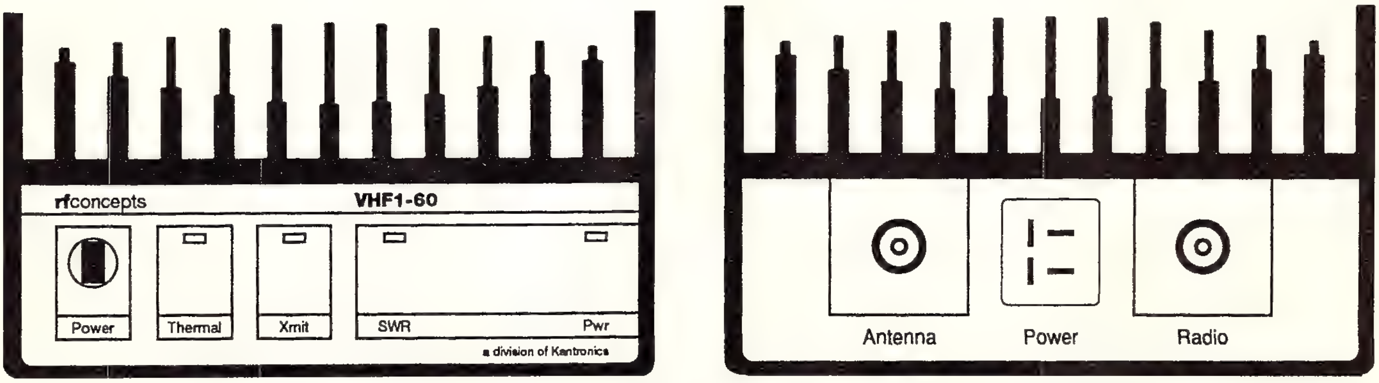
The booklet-cum-manual supplied with the VHF1-60 warns you that the device is not meant for continuous duty, and even tells you that you shouldn't really design your own repeater with this unit as the main amplifier. I can appreciate the problem but am a little surprised they are so cautious given the heavy metal chassis and the large ribbed heatsink employed in the VHF1-60.

Trying it out

Connecting up the VHF1-60 is a simple enough task. The 12 volt leads go to a suitable 12 volt supply, the antenna goes to the antenna socket and you connect a length of coax from your HT to the input socket on the amplifier. The latter is a cable that you must supply yourself and, naturally, must match the rig you are using.

And that's it! Press PTT and a gentle clunk sounds as the amplifier switches over to transmit. I didn't try the thermal overload protection but it was tempting to do so. I reckon it would need at *least* a half-hour CQ call to even approach that state. Apparently a 20 minute continuous burst will do it, the manual tells us. *(I can think of someone suitable for that test, Neil... Ed.)* Likewise, I didn't try to make the SWR LED turn on deliberately. I trust that the power level would be reduced If I mismatched the antenna somehow — but I didn't want to tempt fate with someone else's amplifier! Again, I reckon the design seems secure.

On the air, using my trusty seven-watt IC-2GA the order of signal increase was only a couple of S-units at the most



*The latest **rf**concepts amps use a visually-appealing heatsink — and it works very well.*

(yeah, yeah, mathematicians, I *know* how dBs work!) but on a weak path, the increase at the other end helped far more — and I could turn the rig down to low power and still have the same output! Worthwhile? Sure! I also confirmed that there is no noticeable degradation in the quality of the signal when the VHF1-60 is switched in and no-one commented about any extras on the band or that sort of thing at all. In short, you go from a couple of watts to a full 60 watts with no hassle.

You don't get any power measurement indication on the VHF1-60, which is a bit of a shame. As measured on a wattmeter, the VHF1-60 produced just a squeak under 60 watts of output by the way. After an hour of general chit-chat QSO, the heatsinks were hardly warm.

The VHF1-60 is an FM-only device, so for those with SSB or CW capabilities, think twice. That's not really a problem — it's aimed at the users of HTs only.

The manual supplied is 16 pages long and helps to a certain extent. Most of the second half of it is about legal bumf, how not to copy this and that and what to do if the amplifier goes bung or if it is attacked by a herd of elephants and the like. Not the friendliest stuff — but it *was* printed on the 1st of April 1993, so what can you say? A full circuit is supplied.

Summary

The **rf**concepts VHF1-60 will fill a definite need for those who crave a little more zap from their hand-held transceiver. The VHF1-60 boosts its 1-8 watts to 60 and sports a good range of protective circuits. While it has no metering, the status LEDs provide some consolation. Without doubt the internal construction is excellent with flow-soldered techniques being obvious.

This unit may well pave the way to a bigger signal from the car or amateur shack for many stations. I recommend the VHF1-60 to anyone wanting to do just that!

Amateur Radio Action thanks **Stewart Electronic Components** for the loan of the review amplifier. It costs $487.50 and stocks are available now.

PS. Keep watching for more **rf**concepts reviews. The next one will be a beauty — we have a couple of dual-band amplifiers in our hands, one of which is so big it can easily break the legal power limit on two metres and match it on 70cm!

SPECIFICATIONS

Frequency range:	144 - 148 MHz
Power input:	ranges from 1 W to 8 W
Power output:	60 watts into 50 ohms
Duty Cycle:	intermittent
Mode:	FM only
SWR protection:	ALC operated
Over-temp protection:	Cuts in at 55° C
Voltage requirements:	13.8 V at 12 amps
Size:	127 x 229 x 64 mm
Weight:	3.18 kg
Input/output connectors:	SO-239

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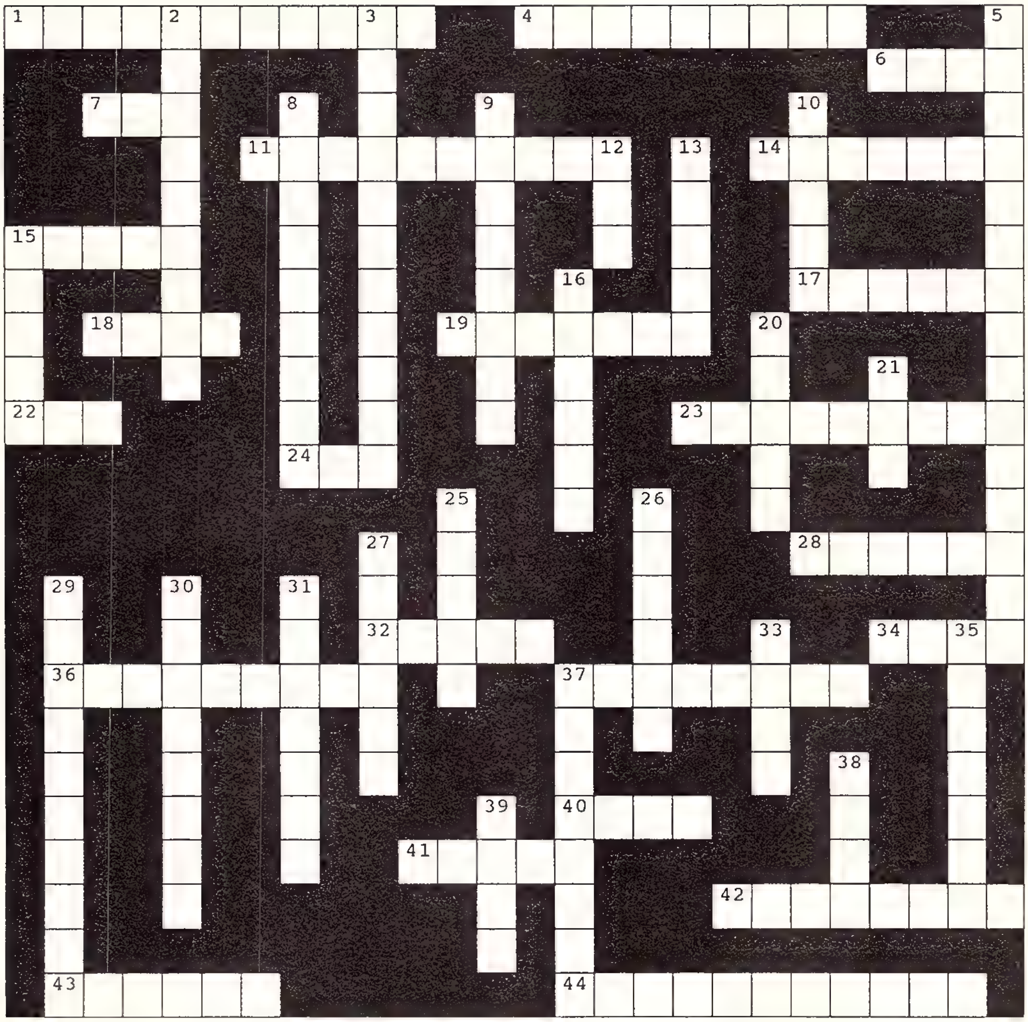

CLUES ACROSS

1. A frequency which is an integral sub-multiple of a frequency to which it is referred.
4. Radio waves can be measured in terms of their frequency, wavelength, speed of propagation and ....
6. If you heard the prefix 5V7 you would expect the operator to be in ....
7. Earth-Moon-Earth.
11. A single-layer coil of wire wound to form a long cylinder.
14. The opposite to active (circuits).
15. A device placed in parallel with or across part of another device.
17. A device or circuit which requires an operating voltage.
18. If an antenna's ...... is too long it might not fit into your available back yard space.
19. Two conducting elements used in parallel.
22. Maximum amplitude that can be obtained with any combination of signals.
23. A circuit used to convert one frequency to another.
24. 'Moonbounce' again.
28. What is the Christian name of DX columnist Jim Smith's wife? (Hint: she writes *YL Forum*.)
32. Which company makes the FT-26 hand-held transceiver?
34. To influence current to flow in a specified direction by means of DC voltage.
36. Which company makes the ARX-270B antenna?
37. The new Kenwood TS-50S is claimed to be the "...... HF transceiver currently available..." (in Australia...).
40. Slang term for an integrated circuit.
41. Rhode Island is in which American call area?
42. For DXers, the more of these the better.
43. An LA prefix probably means the operator is in ....
44. There's a planned VK4CRR DXpedition to a VK9M area. What is the name of the actual location? (7,4)?

CLUES DOWN

2. Who makes the AL-811HX?
3. To estimate a value between two known values.
5. Name the comms receiver made in the UK which we recently reviewed.
8. A collection of distinct components; a complete circuit rather than a discrete part of an overall circuit.
9. What's the name of the well-known DXer who has the callsign VK9NS? (3,5)
10. What make of motor vehicle was featured on the cover of ARA Vol 16, No 1?
12. With respect to antennas, what does the 'L' stand for in 'LP'?
13. What is the Christian name of the First Asst Secretary, Radiocom Division, Department of Transport and Communications'?
15. Two or more stages of a circuit that in combination perform a particular function.
16. In the term 'DSP', what does the 'S' stand for?
20. North Dakota is in which American call area?
21. Q-code for 'low power operation'.
25. Name the diode which is named after its inventor.
26. In the term 'GPS', what does the 'G' stand for?
27. In which American city is the world's biggest annual amateur HamVention held?
29. Signal energy used to drive a transmitter stage.
30. Which cartoonist pens 'Heroes of Ham Radio'?
31. A radio receiver which automatically checks various frequencies for activity.
33. What's the 'low-line Morse Key Kit' sold by one of our advertisers called?
35. An essential element to the successful operation of any transmitter.
37. In the term 'SMA', what does the 'S' stand for..?
38. A circuit or device, depending on the nature of the input signal, which can permit the passage or blockage of a signal.
39. A device consisting of L and C components which blocks a specific frequency while allowing the passage of other frequencies.

Answers next month!

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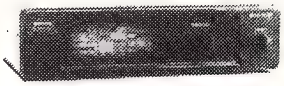

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BBS bytes

By Len Shaw, VK3ALS@VK3YZW

PO Box 622, Mount Eliza, Victoria 3930

One of the major radiocommunications-orientated BBSs in Victoria is **Spectrum** on (03) 819 9167. This board, which has now been in operation for several months or so, is arguably one of the better for both quantity and quality of available files for downloading.

System operator (Sysop) Michael Evans has gone to a great deal of trouble, not to mention expense, to make his board successful, and it carries a huge number of files categorised into some 150 separate areas.

As a small indication of this board's dedication to radio comms material, here are just a few of the specialised areas: radio technical, computer radio-control software, amateur radio maps, packet radio documents, shortwave radio text files, 'ScanBuff' database files, RF design tools, general radio text files and computer technical files.

Michael also has a CD-based file region and it is here that the really top quality files reside. To gain downloading privileges from the CD areas Michael requires some sort of cash donation towards the running costs of his BBS, a not unreasonable requirement given the volume (and cost) of available material.

In the CD section there are specific areas covering, to name but a few, contest programs, radio exam information, Kenwood radio programs, satellite files, radio TTY files, shortwave files, Oscar satellites, radio QSL files, log programs, Morse Code programs... and a whole lot more.

The majority of files are 'shareware', that is, the author relies on your honesty. This means that if, after having downloaded a file you find it useful, the author expects you to pay a 'registration' fee. It is, in short, a form of 'honor system'. Failure to observe such requirements simply means that program authors lose interest and the availability of such shareware gradually dries up.

Many shareware programs available from boards such as Spectrum are pretty much 'demo programs' which provide you with an overall view of the program, but not with all the 'bells and whistles'. Robin Gandevia's 'Ham Log' reviewed in the last issue is a case in point. The version available from a BBS is sufficient to whet your appetite, however it only has a few of the many features available on the registered version.

The long and the short of all this is that it makes good sense to contribute to the running of your favorite board and, when you find a program that you like, do the right thing and pay the registration fee. All of which brings us to this issue's reviews...

Over the years there have been numerous programs available from BBSs which provide the operator with a graphic representation of the various world time zones, with the better ones providing a view of the world which not only shows local times around the world but also a graphic of the Sun as it moves around our earth indicating night/day regions.

You not only have a pretty picture on screen which you can use to impress your friends, but you can also see the 'greyline' of the Sun's shadow. This gives you an accurate picture of sunrise/sunset around the world which, of course, usually means that it's a good time to try for those DX stations.

It is commonly accepted that the 'greyline' theory works pretty well and many operators swear by it while a few of the unluckier ones tend to swear *at* it.

One of the best known of the many 'greyline' type programs is that authored by Joseph Ahlgren of Arlington, Virginia, USA.

GeoClock by name, the program can be found on most boards under the title GEOCLOCK.ZIP, GEOCLK45.LZH or HAMCLK.ZIP (there are almost certainly others under different names but still the same program although possibly different versions).

GEOCLK45 is version 4.5 and was updated to this version in mid-1992 as a minor revision of version 4.4. Download time is around 10 minutes using Zmodem and 2400 bps.

One reviewer said of GeoClock "...it's inconceivable that you won't like this program...", and most users will agree with this.

The program shows the current time, based on your computer's clock, with a good quality map of the earth. As the Sun moves across the map — with an update every few seconds — all the earth's surfaces in sunlight and twilight are highlighted along with your local sunrise, sunset times, the sun's azimuth and elevation and local times of the various regions.

The 'demo' version as downloaded did not include any maps, although previous demo versions had two supplied — let's face it, the program is not of much value without a map! The separate map program can be found under GEOCLK1A.LZH and these are a world map, 48 US states map, north polar map and US-centred view from space.

However, before I discovered that the maps were contained in the associated GEOCLK1A file I had found two maps in Spectrum area #112 under SVGA1-2.ZIP and this file took five minutes to download at 2400 baud.

One of the maps in this file is for the world and one for USA, however, when you pay the requested $30 (I assume US dollars) for the registered version you receive 25 computer maps plus the zoom, distance measuring and city time displays, none of which are operational on the demo program.

In the registered version there is an add-in called Ham package.

Obviously I'm unable to review this part of the package as I have not yet received the registered program, however from the documentation it appears that when a callsign (or prefix) is entered the following information is available: remote station location, short- and long-path great circle bearings, short and long azimuth and range, remote station reciprocal azimuth, UTC, local and remote station local time, DXCC and WAE country identification, CQ and ITU zones, continent, area and location names. *(Oh. Is that all? Ed.)*

Overall, GeoClock is well worth a look. It took around 11 minutes to download using Zmodem and 2400 bps. Remember that the program is distributed as shareware with the registered version available for $30 (US currency I think) and there is an order form contained within the demo file.

See you next time. 73 from Len.

Islands on the Air

no man is an island...

By Jim Smith, VK9NS
Norfolk Island, South Pacific

For some time, the idea of writing an article on the **Islands on the Air** Award (IOTA) has been on my mind due to the strong impression that this award program is attracting a great deal of attention. The reason is perhaps the fact that many DXers have made huge inroads into the DXCC award. There has been very high levels of activity from many previously unavailable DXCC countries.

The growing interest in the program means that radio amateurs are actually going to islands in the name of IOTA Many of these islands would normally be inactive in amateur radio terms.

It is realised of course that such activity has been going on for years, Heard, Bouvet, South Sandwich, South Georgia and, a bit nearer my own doorstep, Banaba, Willis, and so on. But such activity has always been in the name of DXCC — the fact that the island may also have an IOTA number has rarely been the driving force behind the DXpedition.

It now appears that this outlook is changing.

DXCC is quite easy to define — 100 countries confirmed and that is it. It is also true to say that many DXers *do* go on to work the complete DXCC country list, with only multi-band and multi-mode QSOs providing that extra challenge.

What makes IOTA different is that, by definition, *islands* are the focus of attention rather than countries. (many islands are also countries). The challenge now becomes 100, 200, 300, 400 different islands to be worked and confirmed. I would add at this point that a further difference is that there is no award endorsement for CW IOTA, SSB IOTA, no multi-band IOTA or whatever. This may also be another reason for the apparent increase in interest for the program. Work and confirm island X once and that is it.

Another factor may have crept in. The fact is that many radio amateurs find themselves in the position of having an island or several islands in their area which qualify for IOTA They too can generate interest and excitement on the bands by activating an island for the benefit of the IOTA hunters. This is very similar to that of a DXpedition and the DXers have long been interested in this sort of activity.

The IOTA program was conceived by **Geoff Watts**, SWL BRS 3129 way back in 1964. Being very active in those days I can remember the basics of the IOTA Award idea being released.

Geoff gave his reason for the idea of IOTA viz:

"Now that propagation conditions are poor, DX getting scarce, the possibility of brand new countries eventually becoming remote, top DXers retiring because there is nothing new left to work, it is proposed that an entirely new DX achievement be created, the **Islands on the Air** Award, to promote more activity and interest among all DXers, many of whom could then go on a brand new island DXpedition themselves."

It is surprising to read this today and realise that it was written in July 1964! With some very minor changes it could almost have been written yesterday... Geoff Watts could talk with authority, a recipient of the prestigious *CQ Magazine* 'Hall of Fame', the first SWL station to be so honored. First G-land SWL to have 40 zones confirmed (how quickly we have forgotten the eternal silence of Zone 23 of just a few years ago!). Apart from also having over 300 countries confirmed (as an SWL) he also published the *DX News Sheet* for some 20 years (1962-1982).

Finally the illness of his wife forced him to give up the publishing of the DX News Sheet. I can vouch for the strength of the DX News Sheet: in DXing terms it set the very high standard which is still followed today under **Brendan, G4DYO**.

The progress of the IOTA has been steady. The first 100 Islands Awards certificate was issued two years after the start of the award program, to a Swedish SWL, Eskil Eriksson. This was followed, on the same day, by the second certificate being issued to G8JM. It took over four years for the first 200 Islands Certificate to be issued to W8DE. Yet another 10 years elapsed before the first 300 Islands certificate was issued to IT9JT... incredible really.

In 1985 Geoff Watts asked the **Radio Society of Great Britain** (RSGB) if it might be interested in taking over the program. Luckily, the RSGB *was* interested, and used its HF committee to administer the then existing IOTA Awards program. As we move into the period of the RSGB administration of the IOTA Award it became obvious to many that the system as it stood needed a major overhaul. This comment in no way diminishes the efforts of Geoff Watts.

My basic problem with IOTA in those early days was this: it appeared to be a bottomless pit. There must be *thousands* of islands (as indeed there are) in the world. Where is the end of the tunnel?? Also on a more personal note as I moved around, my previous island score became nil at my new DXCC location. (similar to rules for DXCC). Since my priority was always DXCC at the new location rather than IOTA I always chased DXCC. However, there were many followers of the IOTA program... how else could we have totals of 400, 500 and 600 islands confirmed by the top IOTA hunters? Mind boggling in a way.

The HF committee of the RSGB can take credit for the reorganisation of the IOTA program into more meaningful terms. For example, as radio equipment became more portable it becomes easier for a radio amateur to hop over to 'island X' and activate it in the name of IOTA. As a result there was an endless stream of requests to IOTA for the allocation of IOTA numbers, and it became obvious that something had to be done.

Credit must go to **Roger Ballister, G3KM** who, since 1985, has devoted endless hours to defining, in terms of IOTA, which islands would count for the program. The current *Islands of the Air Directory*, released in early 1993, defines in absolute terms the total count of islands which qualify, or would qualify, for an IOTA number. In addition, due to the efforts of the IOTA committee, the rules and conditions for the award are also clearly defined. There are a whole range of IOTA awards to chase.

An IOTA number is allocated to islands in seven distinct areas: Africa, AF; Antarctica, AN; Asia, AS; Europe, EU; North America, NA; Oceania, OC; and South America, SA.

To give the basic outline a simple example for each area will suffice:

AN-001	VP	Adelaide
AF-001	3B6	Agalega
AS-001	VU	Andaman
OC-001	VK	Australia
OC-001	SV	Dodecanese
SA-001	CE	Easter Island

It is obvious from the above examples that there is no conflict — we *know* they are islands. However it is the defining of the island or island group, in the directory, which tightens the whole award into something much less open-ended. A short example of an entry for a particular area will explain the point.

In the Oceania section of the directory under Cook Island (as listed below) sub-heading Northern Cook Islands shows:

OC-014	ZK1 a.	Manahiki Atoll (include Rakahanga)
OC-082	ZK1 b.	Pernryn Atoll (Tongareva)
OC-098	ZK1 c.	Pukapuka Atoll (Danger Is.) (incl Nassau)
OC-080	ZK1 d.	Suwarrow Atoll (Suvorov)

Against each entry in the directory two further columns give the latitude and longitude of the island or group area.

The format is repeated for the Southern Cook Islands and for all other groups in the Oceania region! At this point one should begin to comprehend the sheer magnitude of the effort required to produce this definitive IOTA directory... especially when one also adds the listings for EU, AF, SA, NA etc.

Returning to that small letter **a**, **b**, etc given against each entry, this system provides a useful reference initial when discussing islands. Sometimes there is no number allocated since the area has not been previously activated. So one frequently hears those radio amateurs interested in IOTA talking in terms of small c, small d, and so on when referring to some island or group. It is true to say that many areas listed may not *ever* be activated due to difficulties with landing, difficulties getting permission etc.

In the European Listing under British Isles, sub heading Scottish Islands, we have: EU-(no number) GM j. Rockhall Island This island is all but impossible to set foot on, but it is listed nevertheless.

At a recent get together with Roger, G3KMA and other members of the RSGB IOTA Committee, I was told that

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some 99.9 per cent of the islands and groups of islands have been completely catalogued in the latest IOTA directory. Brave words, but as Roger, G3KMA, states "...if any country is dissatisfied with the current IOTA definition system, which may preclude this island or that island, then they are welcome to generate their own award." Some countries have done so. So, in the current IOTA Directory, the following numbers have been allocated, to islands, viz:

AF 001	065
AN 001	017
AS 001	102
EU 001	60
NA 001	180
OC 001	182
SA 001	062
total	768 islands (or groups)

So, with that sort of total of the islands currently valid one can see the challenge. Of course many of those listed were available many years ago and may never be re-activated. Kuria Muria, Farquar, Aldabra etc but confirmed QSOs are okay from November 1945.

However, by the same token, many islands are being activated today for the very first time. An example of this is the recent operation by Brian Young, VR6BX, of Pitcairn fame, signing VR6BX/P from Ducie Island lying some 280 nautical miles from Pitcairn Island. This remote spot was allocated a brand new IOTA number OC-182.

Incidentally Ducie Island is listed in the Directory, as OC - (no number) in the current Directory under Pitcairn Island and against small letter a. So one can see that if a newly-activated island qualifies then a number is quickly allocated.

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There are also a few conditions for the 'new ones' such as a minimum number of 50 QSOs in at least five DXCC countries. Totals of 100, 200, 300 400, are certainly within one's reach. The first sign that you have been bitten by the IOTA bug is a restless search through old log books. Of course to find those hidden goodies one must have kept a good log in the first place!

It soon becomes apparent that many islands are easy to work and confirm, as they usually fall into our basic ideas of an island. We may have many islands confirmed as a result of our interest in DXCC. However checking for some of these elusive Scottish, South American, Oceania etc islands may be quite a challenge. Where *was* AL7HS/KL7, for example, in downtown Fairbanks or out on a rare Alaskan Island?

If you really feel that the IOTA program has something in it for you then it is my solemn duty to warn you that you will find yourself getting 'involved'. Those old log books will certainly keep you busy for a while. Did VK9NS/P count for something special; how about that UAØXYZ — was he on Wrangel Island; wonder how VE7AZT/KH6 will feel about getting a QSL request from me for a 1982 QSO?? I see by my log that he was on the French Frigate Shoals and that it has an IOTA number OC 055, reference little a. under Hawaiian Islands (as listed below)? This is a very *very* rare location.

Speaking for myself and my current interest in IOTA (IOTA 300 achieved) I find the IOTA group a *great* bunch. There is a wealth of information of who was where, whether it counts and so on available just for the asking. The IOTA meeting frequencies of **14,260 kHz**, **21,260 kHz**, **28,460 kHz** and **28,560 kHz** are very user-friendly. This is where you will get the latest word on IOTA activity.

In passing, it must be said that if you join the IOTA group, it should be a priority to try to keep the program in good shape. By that they mean good operating, consideration for the operator on the island you are chasing. In short, following the code of basic principles discussed in the IOTA Directory.

Oh yes, while I have your attention, any chance of you going to that island, reference little **d**? We all need this brand new one and it is only a hundred miles off your coast line?

Come to think of it — it all seems a bit like DXCC, but with that total of over 700 current numbers it still means many more areas than DXCC. Dare I shout ***HELP***!!!

Acknowledgments

Without the kindness of **Roger Ballister, G3KMA** and his permission to quote freely from pages of the current IOTA Directory it would have been much harder to put this short article together. Without the work of Roger and the past and present members of the IOTA Committee, (a subcommittee of the RSGB HF Committee), the IOTA program would not be in its present form. Finally without **Geoff Watts**, who conceived the IOTA Award, we would not have this wonderful idea to chase.

Further information may be obtained from Roger, G3KMA. In addition the following country assistants have been appointed.

Dewitt L. Jones, W4BAA	USA
Jean-Michel Duthilleul, F6AJA	France
Mauro Preliasco, I1JQJ	Italy
Dr. Rafal Krawies, SP6TMP	Poland
Hans-Georg Goebel, DK1RV	Germany

73 from Jim, VK9NS, Norfolk Island OC-005 — ref g...

DICK SMITH ELECTRONICS

EX-DEMO CLEARANCE!

YAESU FT-1000

YAESU

SAVE $500

Now's your chance to get the 'Best of the Best' at a bargain price! Right now you can pick up an ex-demo FT-1000 deluxe HF all-mode transceiver and save $500. Here's what the experts have to say about this incredible transceiver...

On Operation

"The layout of the front panel of the FT-1000 is just right... I reckon the FT-1000 is (operationally) far less complex than either the Icom IC-781 or the Kenwood TS-950S." -ARA
"I found the FT-1000 easier to learn and use than any other radio in its class."-QST

On Documentation

"clearly written and complete, and includes a complete set of schematics and many high quality photos"- QST
"The quality of printing and presentation of this book is the best I have seen..."-AR

On the Receiver

"... this rig has a very strong receiver; it has the best overall performance (in terms of sensitivity and dynamic range) and the highest third order input intercept of any commercial radio ever tested in the ARRL lab." -QST*
"The direct digital synthesizer works very well and produces receiver performance that sets new standards."-AR
"I found the receiver in the FT-1000 to be astonishingly sensitive and immune to cross modulation..."-ARA

Transmitter - SSB

" the FT-1000 is easy to adjust and use.... The processor adds quite a bit of punch to SSB signals; hams I worked on SSB with the FT-1000 gave me good audio quality reports"-QST
"Reports were all very favourable, especially when using the speech processor."-AR

Transmitter - CW

"CW keying was a delight...power output was checked in the CW mode and found to be well in excess of 200 watts on all bands..." -AR
"On CW the FT-1000 was absolutely faultless." -ARA
"CW operation with the internal keyer is a breeze... "-QST.

Transmitter - RTTY/Packet

"Using the set on HF packet was an absolute pleasure..."PW
"Packet and RTTY modes were tried and proved just superb."-ARA

Conclusion

"...the FT-1000 represents unbelievable value..."-AR
"It's an excellent set worthy of accolades and rave."-ARA
"...the FT-1000 needs little for me to consider it the ultimate contesting and DXing machine available today..." QST*

The FT-1000's combination of Direct Digital Synthesis, high output power, ultra-high performance receiver and easy to use controls put it far ahead of the competition. Hurry in today and check out our limited number of ex-demo models all with a full 2 year warranty. Wouldn't you rather be using the "Best of the Best?"

Cat D-3200

2 Year Warranty

$5495

HURRY, VERY LIMITED STOCKS!*

(ex-demo models only) Includes MD-1 desk mic

Magazine Reviews:
ARA - Amateur Radio Action Vol.13, No.2
AR - Amateur Radio August 1990
P.W. - Practical Wireless January 1990
QST - ARRL QST March 1991 *(review with optional filters fitted)

Copies of our 12 page colour brochure are available upon request. Phone (008)226610 or (02) 8882105

Some models may be shop soiled. However all come with a full 2 year warranty.

*** Ex-demo units are available at these stores: Please phone to check availability. York St** (02) 267 9111, **Nth Ryde** (02) 878 3855, **Chermside** (07) 359 6255, **Brisbane City** (07) 229 9377, **Coburg** (03) 383 4455, **Bourke St** (03) 639 0396, **Adelaide** (08) 232 1200, **Perth City** (09) 328 6944

FT-890

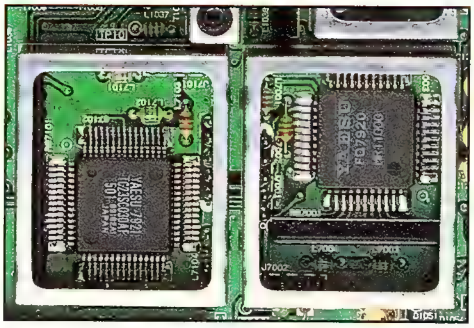
COMPACT HIGH PERFORMANCE
HF TRANSCEIVER

‘LOOKS LIKE THE FT-757GX

Every now and then a truly remarkable innovation takes place... and you know immediately, that a legend is born! There's little doubt that the sensational new FT-890 HF Mobile Transceiver is such a legend. Yaesu have incorporated many of the features from their renowned base-stations into this very compact mobile, so much so that we like to think of it as 'the FT-990 of mobile rigs'. Just like the FT-990, the new FT-890 continues Yaesu's design goals of making technically superior, feature packed transceivers that are fun to use and yet very reasonably priced. Compare the FT-890 with the rig you're using now!

Clean Transceiver Operation

The FT-890 uses the very latest Direct Digital Synthesis (DDS) technology to provide much higher purity local oscillator signals than traditional PLL designs. The two DDS's ensure exceptionally low noise transmitter output, improved receiver performance and the very fast transmit/receive times needed for digital modes like packet radio. Together with the magnetic rotary encoder used by the main tuning dial, the DDS's provide the feeling of the best analogue VFO's but with all the advantages of digital control.



Exceptional Receiver Performance

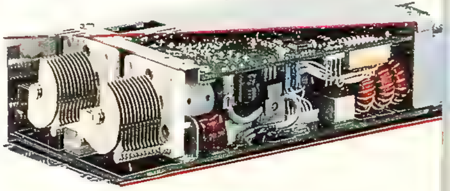
The FT-890's triple conversion receiver covers the entire 100kHz to 30MHz range with high sensitivity and a wide dynamic range. For clearer reception of weak signals, the receiver uses a low noise dual FET RF amplifier followed by an active quad FET mixer with a high first IF of 70MHz. All this ensures excellent image rejection and, together with the use of DDS local signals, results in receiver performance that is noticeably superior to previous designs.

Flexible Transmitter Operation

Yaesu's innovative die-cast top panel heatsink and thermally switched duct-flow cooling system allows high duty-cycle transmissions with up to 100 watts output in SSB, CW and FM modes, or 25 watts carrier on AM. For the easiest operation the transceiver offers VOX, an iambic CW keyer with dot/dash memory, full/semi break-in CW, an inbuilt SWR meter and an all-mode RF power output control. Plus, an effective speech processor lets you tailor transmitter audio to your voice/microphone combination for greatly improved SSB talk-power.

Automatic Antenna Tuner

An enormous bonus for the mobile H
enthusiasts is the optional automatic antenn
tuner (ATU-2) which is internally mounted an
operated from the front panel. The optiona
ATU-2 uses its own microprocessor and 3
memories to automatically store tuner setting
for exceptionally fast recall when you chang
frequency.



Interference Rejection Facilities

For better reception under crowded ban
conditions the FT-890 provides both IF Shift an
IF Notch controls and you can install optiona
filters for enhanced SSB skirt selectivity, as we
as a choice of optional 250Hz or 500H
bandwidth CW filters. Other valuable feature
include an effective variable noise blanker and
direct-feed mixer button for clear copy of ever
very strong signals.

Frequency Control

With a 16-bit main processor and four co-
processors, frequency control is incredibl
simple. Two independent VFO's per band hol
their own frequencies and modes, while 3
tuneable memories store all of the data for bot
VFO's. Split frequency operation as well a
memory/VFO transfers are a breeze.

---

* By Neil Duncan, ARA Volume 15 no. 4

FT-890

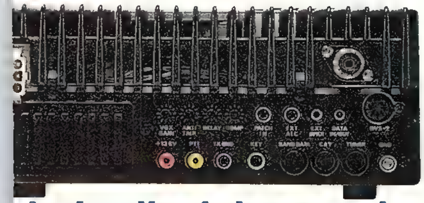
COMPACT HIGH PERFORMANCE HF TRANSCEIVER

YAESU

GOES LIKE THE FT-990*

credibly all And Light

FT-890 is incredibly small and rugged, so deally suited to both mobile and base n operation. Weighing in at under 6kg and suring just 238(W) x 93(h) x 243(d)mm, it quality epoxy PCBs and surface mount onents for high efficiency, superb reliability serviceability. Plus, there's no overhanging heatsink to hinder mobile installation and luct-flow cooling system ensures the FT- runs cool, even with high duty cycle missions. A comprehensive array of rear l connections gives added flexibility for -station operation.



chnically Advanced

outstanding mobile HF transceiver porates a hosts of standard features which imply not available on most other rigs in rice range. Take a look...

optional internal automatic antenna tuner tes on all HF amateur bands, even 160m. of the rivals internal ATU's only cover 80 n! Also, the ATU-2 has a very wide lance tuning range, allowing more useable vidth when using high quality mobile . So why limit your operations?

ally tough conditions, Yaesu's frequency- d processor, which allows tailoring of SSB nitter audio to your voice and microphone cteristics, will provide more punch to get ignal through.

- The audio-based notch filters used by some of its competitors can suffer from AGC lock-up. Yaesu took the smart approach by using an IF-based notch filter to effectively reduce interfering carriers without being affected by AGC lock-up even when notching strong signals.
- Wouldn't you like to have a variable noise blanker with performance that's referred to as 'the best in the mobile business' (ARA Vol.15 no.4) Only Yaesu has it!
- The FT-890 provides simple pushbutton FM repeater operation on 29MHz, with CTCSS encode as standard. Compare!

YAESU

- Yaesu transceivers are covered by a 2 year warranty...Why accept anything less?

A delight to use and an outstanding mobile rig by any standards. The sensational new FT-890 mobile HF transceiver offers performance and flexibility that until now was unheard of at this price.

Cat D-3270

2 YEAR WARRANTY

$1995

"I found the FT-890 an absolute delight. It is an outstanding mobile rig."
Neil Duncan, VK3OK Amateur Radio Action, Volume 15, No. 4

"The performance of the FT-890 is, in a word, excellent for a transceiver in its class."
Ron Fisher, VK3OM, Amateur Radio, August 1992.

Other Amateur press comments included:

"The tuning control is superb."
"...the best status indicators I have ever seen."
"...variable noise blanker (the best in the mobile business)"
"...the 42-page manual is the equal of any I have ever read for an amateur radio set."
"The transmit audio is very good..."
"The receiver is as clean as a whistle..."

DICK SMITH ELECTRONICS

B1371

ON-6

The shrinking world of six metre DX...

Despite the reduction in solar flux there has been DX available for those prepared to put in the hours. Recent contacts into VK include XX9, G4SMC/9M6, XU Cambodia, VS6 Hong Kong, BV2 Taiwan, UZ0 Russia, Tuvalu, Tarawa, PNG and Japan. Extensive extension via E-layer from the southern states was noticed during the beginning of the Winter E season, which commenced in late May.

A report of DX worked in Japan for April/May lists the following callsigns:

April 02: VK8ZLX.
April 03: VR6JJ; VK4IAM; P29CW:
April 04: XU0UN; HL9UH; VK4SIX; VK4VV:
April 07: VK4KK; XU5DX:
April 10: FK8DH; VK4KK, VK4RO:
April 11: VK2AUP; VK2GLS; VK4WTN; VK4AFL; VK4PU; VK4WHO; FK8DH; V63AO; VK8AH:
April 13: VK8RH:
April 15: VK6JQ:
April 18: V63AO:
April 22: G4SMC/9M6; VK2QF; VK3OT;
April 24: XU5DX, XU0UN, G4SMC/9M6;
April 26: KG6DX; VK4JH; VK6JJ; ZL2TPY; VK6JQ:
May 01: HL9UH; VK6JJ; VK6RO; G4SMC/9M6:
May 02: G4SMC/9M6:
May 03: RZ0CZZ; G4SMC/9M6:
May 04: RZ0CZZ; G4SMC/9M6; S21ZQ:
May 05: RZ0CZZ; XU5DX:
May 06: RZ0CZZ:
May 07: XU5DX
May 09: HL9UH; BV2DQ; BV2DP; DU; VK2; VK3; VK4; VK6; VK8; VS6; G4SMC/9M6:

A report from VS6 during March shows some good DX contacts including:

March 02: 1320z XU5DX.
March 06: 1300z 7Q7JL also at 0240z by VS6XMQ.
March 07: 1239z JH1MAO/JD1.
March 10: 1400z DX1HB/B, JR6, VK8AH, VK8VF/B, XU5DX, XX9LF.
March 14: DX1HB/B, P29CW, P29BPL/B, VK4FP, VK4TL, VK6JQ, VK8VF/B, V85PB.
March 15: 1300z DX1HB/B, JA1, P29CW, VK4FP, VK4JH, VK8VF/B.
March 18; 1300z YB0HD, YC0UVO.
March 20: 1000z VK4FP.
March 21: 0630z KG6DX.
March 22: 1325z VK8VF/B.
March 23: 1200z DX1HB/B, P29JA, P29BPL/B, VK8ZMA, VK8VF/B, XU0UN.
March 26: 1442z XU0UN.
March 30: 1140z DX1HB/B, P29CW, P29BPL/B, VK8VF/B.

Current activity stems from VS6BG, VS6WV Mike, VS6XMQ Steve and VS6YHT Brett.

Thanks VS6BG for the above report.

Viva la France!

Activity from S.W France JN05 during March 93:

March 05 1700z ZS9A (JG77) heard.
March 08 1245z ZS6PWS hrd on CW
1248z ZS6PJS QSO KG46
1250z hrd V51VHF (JG87) beacon.
March 11 1710z V51VHF 559.
March 20 1645z V51E 55 on SSB HRD
V51VHF 529 QSO.
QSO WITH EH2,S5,I3
March 21 1505z V51VHF 539, 579 at 1610z, 599 at 1620z.
1605z hrd 7Q7QL
1626z ZS6PJS hrd CW 529
1700z end of opening.
March 23 1643z V51VHF 529.
1718z V51VHF 519
March 30 1730z V51VHF 529

During this month only weak openings via TEP with South Africa.

French Call frequency:

"To increase the number of QSOs between French and foreign stations, we inform you that a call and French activity frequency on the six metre band has been set:

"Thank you for sending this information all around you, listen and call France on 50.120 MHz.

French Beacon frequency:
FX4SIX 50.315 MHz
50W ERP Horizontal Crossed Dipoles.
CW (a1a) FX4SIX JN06CQ
QSP Reports to Club Station FF1OFL,
PO 37
86170 Neuville de Poitou.
FRANCE

Good DX on the Magic band !

73 from Didier FC1MXE JN05GQ

P29CW reports...

50 MHz propagation report from Pete Linden P29CW, Ukarumpa (QI23wq):

April 11: Heard DX1HB, JA2IGY, JA6YBR, JA7ZMA (strong early on), VS6SIX 48.250 S-7 and 49.750 TV S9+20.

"Nothing much during the daytime (that *I* heard, anyway! HI), but interesting events at night. I felt like a spectator at an exciting show.

"During the first part of the evening here, I heard Jack, T30JH talking to Ross, XU0UN on 28.885 MHz and asking him to QSY to 50.110 MHz, as he felt he might have propagation to XU. They went up, and things got pretty exciting; Jack could hear Ross 5/1, but Ross could hardly tell that Jack was there! Jack worked Ross cross mode (CW/SSB) and made it on the second try for a 3/1 report from XU0UN! It was right at the edge of the propagation. Good stuff, and as I said, exciting to listen to. I could hear Jack 5/1 off the back quarter of the quad, no copy on Ross at this time.

"But later at 1052z, as I was typing yesterday's bulletin and listening on 50.110 MHz, I heard Ross start calling CQ and we had our second QSO. It was pretty weak, 5/1 for him and 3/1 for me but we heard each other with a bit of work. He was only in here for 10-15 minutes, and faded out.

"He worked a BV2 after that, but I couldn't hear him at all. The BV2 was S-5. This was probably at 1120-1130z. Jack T30JH, also thought he may have heard a V85 calling him on CW just after he worked XU0UN, but wasn't sure.

"So there was some good east west propagation around the Pacific last night. Ian, T20AA was working Jack at the time that Jack worked XU0UN, but Ross was unable to hear Ian. Just that I guess, though I heard Ross here at 6 degrees south (but a lot further west!) It's hard to guess. Maybe half an hour or so later, like it was at my QTH...

"So that's the size of it here. Sure was fun while it lasted! The band faded to JA at about 1300z, with JA6YBR being the last to fade, as usual. VS6SIX went about 15 minutes later, and DX1HB was still weak but readable when I went QRT at about 1330z. Had to get up early in the morning...

"See you on the magic band!

"73 Pete P29CW."

(Packet address: P29CW @ N0JN.CEB.PHL.OC)

Reports from Japan

Feb 05: 0405z VK4s APG, WTN, ZAR, DDC, ALM, ZAZ; VK3s AMK, AZY, DUT, SIX/B.
Feb 07: 0626z 9M2CS.
Feb 11: 0348z VK4KU.
Feb 13: 0538z VK4s PU, ALM, UTT, GMH, IT, AFL.
Feb 15: 0502z VK4s GMH, ZAZ, KU, ZAA.
Feb 16: 0422z VK7ZIF, ZLs 3TIC, 2UJH, 2AGI, 3ADT, VK4s WTN, TON, ZAZ, ZAL, AFL, FNQ.
Feb 18: 0203z VK3s OT, DUT, YWV, KC6RR, HL9UH, P29CW, P29PL.
Feb 19: 0407z VK4s KK, PU, AFL, GMH, ZAZ.
Feb 20: 0647z VK4TL, VK4ZAZ, VK5BC.
Feb 21: 0229z VK2YLO, VK4KU, VS6BG, HL9UH.
Feb 23: 0303z ZL4AAA, ZL3TIC, VK4s AFL, PG, TON, ZAL, GMH.
Feb 24: 0522z VK4ABW, VK4FP, VK4TL.
Feb 26: 0418z VK4EJR, VK4ABW, VK4ABP.
Feb 28: 0348z ZL1AXB, ZL2TPY, ZL3TY, VK4WTN, VK4PG, VK4FP.
Mar 01: 1050z XQ3SIX, ZL4AAA, VK6JQ, XU0UN.
Mar 02: 1232z VK4GMH, VK4AFL.
Mar 03: 0108z PY2DSC, PY2CDS into JR6, VK4s TON, GMH, IAM, JH.
Mar 04: 0810z VK4JH.
Mar 05: 0220z VR6JJ, FK8EB, VK3SIX.
Mar 06: 0910z 7Q7RM, 7Q7JL, VK3SIX.
Mar 07: 0424z VK4DDC, XU/JR5KQF, VK6YCF, VS6BG, VK2UNE, VK3OT, VK4GMH,
Mar 08: 0456z VK4s JH, ZAL, WTN, DV, ZL4AAA, HL9UH.
Mar 09: 0250z ZL4AAA.
Mar 10: 0513z XU5DX, VK3SIX.
Mar 11: 0400z VK3SIX.
Mar 12: 0051z T30JH.
Mar 13: 0615z V73SG, XU0UN.
Mar 14: 0158z T30JH, NI6E, FK8GA, AH6LR, N7ET/DU7, VK2QF, VK1VP, V85PB, VK3SIX.
Mar 15: 0444z T30JH, P29CW.
Mar 16: 0933z VK4FP.
Mar 17: 1532z YC0UVO.
Mar 18: 1020z FR5SIX beacon, YB0HD.
Mar 19: 1030z VK4FP, T20AA.
Mar 20: 0334z VK4WIE/p, VK4UTT, VK4ALM, 7Q7RM, FR5SIX/B.
Mar 21: 0210z PY2BQM.
Mar 22: 0259z VK2QF, VK2GLS, VK4s GMH, IT, ZAL, KK, ALM, VK6JQ, FR5SIX, P29JA, XU5DX.
Mar 23: 0855z FR5SIX/B, 7Q7LA.
Mar 24: 0100z VK3SIX, AH6LR, NI6E, YJ8LB, BV2DP, FR5SIX, HL9UH.
Mar 25: 0217z T30JH, VK4s LE, DV, ZJR, FP, YJ8LB, HL9UH, P29ZGD, VK2QF, VK3SIX.
Mar 26: 0700z VK3SIX/B (50.053 MHz), FR5SIX/B (50.021 MHz).
Mar 27: 0452z T30JH, 7Q7RM, 5R8DP (50.123 MHz), VR6JJ, 5R8DP/B, 7Q7LA.
Mar 28: 0925z 5R8DP, 7Q7RM into JR6.
Mar 29: 0750z FR5SIX/B, 5R8DP/B (50.123 MHz), VK4s FP, ABW, TL.
Mar 30: 0412z ZL1MQ, VK4TL, VK4FP, AH6LR, 5R8DP into JA5/6.
Mar 31: 0843z 5R8DP, P29JA, FR5SIX/B.
Apr 02: 0250z VR6JJ into JA1, 5R8DP/B into JR6 (50.123 MHz).
Apr 03: 0150z VR6JJ, VK4s IAM, FAR, TL, FP and ZJR, FK8EB, P29CW, P29BPL/B, VK8VF/B.
Apr 04: 1025z VK4ABW, VK4FP ZJR, VK8AH, P29CW, XU0UN.
Apr 06: 0220z VR6JJ into JA1/3 areas.
Apr 07: 0314z VK2QF, VK3SIX, VK4s TL, ZAZ, ABW, AFL.
Apr 10: 0600z VK3SIX.
Apr 11: 0422z VK4s AFL, ZAL, ZDK, ALM, TL, ZJR, FP.
Apr 12: 0422z VK4s ZAL, CRO, DV.
Apr 22: 0335z VK3OT, G4SMC/9M6

This report compiled from reports by **Yutaka, JH1WHS**, heard & worked, **JA1VOK** Five/Nine article, and **Ken JA3EGE** via packet radio.

T30JH reports from Tarawa

April 07
2306z VK/ZL TV 5x9+20.
2353z VK3OT CW 309 50.110 MHz.
0046z Worked VK4s KHQ, ALM, KK, TL, JH; ZLs 4AAA, 2TPY, 3NE; VK2QF, VK2ZDH.
0106z VK4BRG/B, VK4RTL/b, VK4ABP/B all copied.
0219z KH6HME/B, KH6HI/B until 0500z.
0224z Worked KH6IAA.
0307z VK2RSY/B, VK4ABP, VK4RTL, VK2RHV beacons all copied on 52 MHz.
0319z Worked VK2ZHE, VK2GTM, AH6LR.

April 08
2107z WIN TV 46.172 MHz 59+ early.
2122z ZLTV video 5x8, Wagga Wagga 5x1.
0104z Worked ZL1ADP, VK4KU, VK4BRG/beacon, heard and also VK2BA 4x1.
0149z Worked VK9NS and VK9NL Norfolk Is 5x1, VK4ALM 5x5.

April 09
2316z 45 ZL TV, 46.172 MHz VK.
2354z Worked VK2BA 5x5.
0144z VK4BRG/b, VK4ZAR, VK4RTL/beacon.
0201z VK4VV, VK4ZJR, VK4DV, VK4JSR/2 Byron Bay.

April 10
2355z ZLTV, VKTV Wagga.
0157z Wagga 9+10dB,
0210z Worked VK2s GLS, ZCP, AUP, BHO, TAN, ISB, VK4JSR/2; VK3s YWV, BQS, AUI, XQ, TU.
0228z VKs 4BRG/b, 4CRO, 2BA, 4EJR mobile, 4NE.
0240z ZL2KT, ZL1THQ, KH6IAA off back, VK4s to FO3BM.
0300z Sydney stations still incoming, VK2LID calling VK4 on top of VK3/VK2 traffic to T30JH.
0415z Band faded out to VK finally.

April 11
2235z ZL and VK TV.
0159z VK4BRG beacon, worked also VK4ZRJ, VK4ABW.
0818z Heard KH6HME and KH6HI beacons.
0850z Worked T20AA beaming to KH6, Heard JA2IGY beacon.
0906z P29BPL beacon, JA6YBR beacon worked T20AA again.
1006z Liaison with XU0UN and worked at 1028z.
1100z Worked P29CW heard DX1HB beacon and VS6SIX beacons until 1345z.

April 12
0149z VK4BRG beacon fading, worked also VK4s TL, HT heard VK4KK, 4DO CW.
0231z VK4BRG/beacon still in, VK4RTL beacon on 52 MHz.
0916z P29BPL beacon for 30 mins.

April 27
2330z-0141z 45/46 MHz television video from VK4/VK2/ZL up to 0600z
0755z KH6HME/B; KH6HI/B; P29BPL/B; VK4RTL/B; VK4BRG/B to 0907z.
0907z Worked FO3BM, all above beacons audible, heard VK4JH on CW 419.

0954z JA2IGY/B; 49.750 MHz Chinese TV
1045z Worked T20AA on CW 539; 48.250 MHz TV 5x7; P29BPL/B around 1255z

April 28
0805z Both Hawaiian beacons audible and worked FO3BM Morea, Tahiti using TS-680S/HL166V PA and pair of 5-element Yagis.
0919z Worked FO3BM and T20AA in round-table QSO, signals until 1015z.
0920z P29BPL/B; VS6SIX/B; JA2IGY/B; 49.750 MHz TV; 48.250 MHz TV.

April 29
0756z KH6HME/B; KH6HI/B; P29BPL/B; FO3BM 5x2; P29CW 5x3; DX1HB/B 419
0922z VS6SIX/B
0942z Propagation into JR6; Heard P29JA working NI6E/KH6
1015z P29BPL/B; KH6HI/B; KH6HME/B; JA2IGY/B plus lots of JA contest QRM
Nil propagation until...

May 04
0925z P29BPL/B; 0928z two VK4s on 50.135 MHz discussing non-return of QSL cards.
1010z 49.750z 5x6 faint JR6 on CW, no JR6YAG beacon

May 05
0846z KH6HI/B 4x1; KH6HME/B 4x1; weak 49.750 MHz TV but no other beacons

May 06
0837z KH6HI/B; KH6HME/B; P29BPL/B; VS6SIX/B
0938z JA2BZY; JA2IGY/B; JA6YBR/B; JA7ZMA/B
1044z Worked JA1, 2, 3, 4, 5, 6, 7 & 9 for 72 contacts until 1306z

May 07
0901z KH6HME/B; KH6HI/B; P29BPL/B; JA6YBR/B; JA7ZMA/B; JR6YAG/B
0939z Worked JI7NQW; heard VS6SIX/B; worked 11 in JA1 and one in each of JA2 and 3
May 09
2300z ZL/TV video
0458z JA2IGY/B; JA6YBR/B; JA2IGY/B all faded out 0900z
May 10
0100z 46.172 TV up to 5x8; strong video crud and no amateur signals.

May 23
0811z JA2IGY/B.

May 24
0855z JA2IGY/B.

Comments: 28.885 MHz totally dead during the day, zero VK/ZL TV and no 28/29 MHz signals.

This report from Jack Haden, T30JH, PO Box 473, Betio, Tarawa Atoll, Kiribati, Central Pacific.

Statistics: Jack has now worked 143 different VKs, 24 ZL and 17 Pacific islands. Unfortunately, the following QSL returns show that Australians are shocking QSLers, particularly VK2, VK3 and VK4.

(Not surprised one bit. Would you send a QSL card to a bureau in a state where they throw out cards belonging to non-members? Disgusting show... If you don't know what I'm talking about, ask the VK2 Division what happens to cards arriving for non-members. Ed.)

The logs from Japan and Tarawa show that the stations who front up day after day and make contacts are listed in the non-QSLers of Jack's log.

VK1 3 worked 1 QSL.
VK2 44 worked 12 returns.
VK3 11 worked 4 confirmed.
VK4 40 worked 12 returns.
VK5 1 worked no card.
VK7ZMF worked and confirmed.
VK8 worked 5 confirmed VK8GF only.
VK9 3 worked 3 confirmed.
24 **ZLs** worked and only confirmed 7 stations.
18 others worked and confirmed 11 contacts.

It is possible that T30JH could leave Tarawa permanently from June leaving a large hole in the Pacific region. *(Nah, Steve, he's skinny. Ed.)*

If you haven't sent Jack a card yet, remember the final courtesy of a QSO is a QSL.

Cambodian activity

Ross has been relocated to a border post named Banteay Meanrith in grid locator OK13.

It is a very remote site and the mail has slowed somewhat. Sometimes I get the logs from Thailand when Ross travels across the border on business trips while other times it's hand-delivered, as it was in June.

March 25
1235z VK8ZAB, VK8ZMA, BV2DP, JH6BPG, VS6WV, P29CW, JR6VSP, JF6UZS.

March 26
1316z JR6HI, JR6YAG beacon 50.044 MHz, BV2DQ, BV2DP, VS6WV.

March 29
1717z JR6YAG 50.044 MHz beacon.

April 04
0804z JA3EGE, JA5EMM, BY/JA2XY, JR2AUE, JA6LCJ, JA3TJA, JF2GWS, JI2CCF
0821z JE6JYT, JA2POK, JA5KTN, JH4QHO, JA2UDU, JE3PCP, JE2UAZ, JM3TTG, JH3CNM.

April 09
1542z JQ3DUE, JH4JLJ, JF1CZQ/6.

April 10
0540z JH0HME, JG1IEF, JF1BMN, JI1HHX/2, JH6AVS, JE3WVA, JG4KEZ/6, JA6LGZ.
0654z VK6HK.
1027z T30JH.
1030z T20AA heard.
1249z P29CW.
1256z BV2DQ.

April 12
0731z VK6YU.
0736z VK6HK.
0741z VK6WD.
0745z VK6AO.

This report from the log of XU0UN by VK3OT.

Six metre news a la carte

- GJ4ICD worked his 142nd country with OM3PC, C31HK and EV9A the last three.
- EV9A is QRV from KO43.
- Beacons heard in GJ include V51VHF, ZD8VHF, FY7 (50.039 MHz) and OD5SIX (50.078 MHz).
- CT3FT worked into Europe in May.
- G8VR reported EH7, CN8HB, CN8ST, CT4KQ, CT1QP and CN8CC logged in May.
- JX3DA heard G3SYC but had to go QRT for work.
- WA6BYA worked VR6JJ on March 20 at 0050z for 10 minutes.
- WB4WTC worked LU5EM and CX8BE on April 4 at 2000z.
- The ex-N6AMG 5-el Yagi from 3D2AG and a 100 watt PA stage was taken back to Cambodia by XU0UN after R & R in Melbourne in mid-June.
- The TS-600 from 3D2AG was also returned by 3D2PO in late April.
- VK8RH reported an Es opening to VKs 4TL, 8ZLX and 8ZTM on May 1. Rex also worked XU0UN and G4SMC/9M6 during April.
- VR6JJ has contacted 33 countries including CE, CO, FM, HC, JA, J3, KH6, KP4, PY, P43, TG9, W4 through W6, XE, ZF2, 6Y5, 9Y4 and VK4BRG who made his QSO on March 13 at 0605z and again on March 14 at 0611z. Erik Roy,

TI2NA made the grade on many occasions between 2335z and 0300z.

- Richard G4SMC has been active in 9M6 Kotakinibaru and worked in to Darwin.
- Mako JA1OEM, ex-A35EM, ZK1XH et al is active was active as 5R8DP, working only into Japan, using an FT-650 and 5-element Yagi. Contacts included JA5, JA6 and JR6 Okinawa, which was the first-ever QSO by JR6WPT at 1150z on March 27. 5R8DG in grid LH31 is proposed by ZS6WB shortly, QSL via F6FNU.
- RZ0CZZ was active again using 50.115 MHz with a beacon and listening up 10 kHz. Operators were joined by JA1UT/1UPA from April 30 to may 7.
- Karl PS7KM will activate St Peter & Paul Rocks with PT7AA for three weeks about the time this magazine hits the stands.
- 9M0S operated from Malaysian-occupied Spratley Island from May 27 to June 02.
- HB0/DA1WA was active from May 28 to June 06, QSL via DJ0LC.
- G4SMC/9M6 Richard has been working into JA and VK from Kotakinibalu.
- Mike UL8GC is operating from grid MO60 until the end of August.
- Kuwait has four active stations at present. They are 9K2s MU, WR, ZR, & USA.
- UW0ST from OO06 Bratsk should be up and running when six metre equipment arrives.
- Ross XU0UN visited Australia during early June and picked up a Yaesu FT-650 & Yagi.
- Nabil 7X2KT is building a home-brew transverter for six metre operations. Keep listening!
- 7Q7SIX has been installed on 50.003 MHz with five watts output from the QTH of 7Q7LA.
- ET3DX was worked into Morocco and Malta and by Athens stations in April.
- Eric XU5DX is active from Sihanoukville (Kampongsan) with 80 watts and a quad. Previous callsigns are J28BR, FK0AQ, TT8AQ, TA5ZA.
- S21ZQ was reported active on May 4 at 1925 JST.
- 5R8DP has achieved some results on six metres including 30 QSOs with JA between March 27 & March 31 as well as TEP into 9H1 on April 24 at 1540z.
- JI2AMA/JD1 is active from Minami-Torishima during the station re-equipping.

*From **JA1VOK, UK6MG, JA3EGE, GJ4ICD** and sources worldwide.*

WK3D DX-vacation in the South Pacific

Nob Nichino, JF2MBF/WK3D arrived in Auckland from Pitcairn Island on the *Queensland Star*, on Friday evening 21 May 1993. Martin, ZL1ANJ, received his ETA info via Hiro JF2PZH.

I met the ship at the Ferguson Container Wharf, and helped Nob to carry his equipment and luggage off the ship to my car. We drove to the Freeman's Travellers Hotel.

On Saturday Martin had a QSO with Hiro JF2PZH on 21.322 MHz to confirm Nob's arrival. Nob went to visit Eric ZL1TDW and had a satellite QSO with JA via Oscar 13. In the evening Nob and Kathy ZL4SO, went with Martin to Chinese Sun-Sun restaurant for dinner. Nob appreciated his first Asian meal since December 1992!

On Sunday Kerry ZL2TPY came to Auckland to meet Nob, and Kerry stayed Sunday night at the same hotel as Nob.

Nob leaves this week for Rarotonga South Cook Island. ZK1. A trip to ZK1 North Cook Island is a possibility. Nob will collect satellite gear already waiting for him in Rarotonga, for DX-satellite vacation in South Pacific.

All log books from Pitcairn Island have now been sent by Air-parcel to QSL Manager in Japan.

DX Location	QSL Manager
VR6JJ	JF2KOZ
ZK1	JA2TBS
3D2	JH2AYB
T2	JA2FJP

Nob is carrying a TS-690 and an all-band vertical and dipoles for HF. He left his six metre Yagi on Pitcairn Island, so it is unlikely that he will be on six metres in the immediate future, unless he locates suitable gear in ZK1.

This report from Martin ZL1ANJ

Packet address ZL1ANJ @ ZL1AB.#AKL.NZL.OC

Memo from Ron Seager, VK4ZJR

Extract from logs, April/May 1993:

April 01: 0629z KH6IAA; 0733z NI6E; 1022z VK4TL
April 03: 1117z HL9UH
April 04: 1038z HL9UH
April 08: 0711z KH6IAA
April 09: 0202z T30JH
April 10: 0720z KH6IAA
April 11: 0208z T30JH; 0237z T30XP; 0320z JA 1, 2, 5 & 7; 0437z HL9UH; 1035z JA1
April 12: 0415z JH0HME; 0650z VK4HT; 0708z JJ6LPG
April 13: 1039z JA6GKW
April 19: 0715z KH6IAA
April 28: 0937z JQ3VDN; 0943z JE2SPG
April 29: 0941z JA1ZLO
May 01: 0900z JA7EYK
May 02: 0925z JE1SHG; 1036z JG4ISS/4
May 03: 0918z JA0, 1, 2, 3, 5 & 7; 7J1ALX; 5 watts
May 06: 0920z JN3JBY; 0935z JA2DJL
May 07: 0903z JI7NQW; 0918z JN1VXD
May 09: 0638z 25 contacts into JA8 areas up to 20/40 dB over S9
May 10: 0914z JE2QHE; 0930z JJ4DYQ/4; 0933z JH1WHS Yutaka
May 12: 0919z JA9IPF; 0948z HL1LTC; 0952z HL1MLO

This report was faxed from VK4ZJR — thanks!

Across the Tasman...

From Bob Cooper, ZL4AAA comes the following report:

Feb 04: VK4s.
Feb 05: JA1, JA0, HL9UH, JA6YBR/B, VK4FAR, VK4WTN, VK4BRG/B, VK2GLS.
Feb 06: JA1, JA7ZMA beacon (50.027 MHz).
Feb 07: HL9UH, YJ8LB.
Feb 09: Worked into JA8 regions.
Feb 10: JA7ZMA beacon at 0240z.
Feb 11: JA1, 3, 4, 7 & 0.
Feb 12: JA3, JA4, T30JH, JA7ZMA beacon
Feb 23: JA1, JA7ZMA/B, JA2, JA4, JA6YBR/B.
Feb 24: JA3, JA2, JA2IGY/B, JA7ZMA/beacon
Feb 25: JA8, JA7ZMA/B.
Feb 28: VK2, VK4 heard.
March 01: JA1, 2, 3 & 5; heard JA2IGY/beacon
March 07: Heard JA7.
March 08: JA7ZMA beacon and JAs for eight minutes.
March 09: JA1, 3, 7, heard JA2IGY/B, JA7ZMA/B, NI6E/KH6, VK4KK, T30JH.
March 10: JA8, JA7ZMA/B, heard JA4, JA9.
March 11: Heard FK8FB, T30JH, VK2 and VK4.
March 13: T30JH, AH6LR, KH6IAA, NI6E/KH6, KH6 beacons.
March 14: T30JH.

March 15: JA1, JA7ZMA/B, T30JH, VK4s, AH6LR, KH6IAA, NI6E, KH6 beacons.
March 16: XE2UZL/B, T30JH heard and worked.
March 17: T30JH, K6LGL, N6CA, N6XQ, W6CPL, WA6JRA, WB2ODH/6, K6FV/B, XE2HWB/B, XE2UZL/B, YV4AB/B XE2UZL/B, YV4AB/B.
March 18: T30JH, heard VK4.
March 19; JA7ZMA/B, T30JH.
March 20: T30JH.
March 21: N6XQ worked.
March 24: Heard JA7ZMA/B, JA8, T30JH, VK4 worked.
March 25: Heard JA1,7,8,0, JA7ZMA/B, T30JH.
March 27: T30JH heard.
March 30: JA8, FO3BM, JA1, JA7, JA6YBR/B, T30JH, VK2, VK4, AH6LR, KH6HI/B.

This report obtained from the June issue of Five-Niner magazine.

Thanks for all your reports. You can fax me on (055) 71 2222 or send your reports to VK3SIX@VK3SSS. See you on the magic band! 73 de Steve, VK3OT.

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PACKET RACKET

The world outside...

By now you all know that I was fortunate enough to get to the **Dayton HamVention** this year. Some of the discussions I had related to packet radio around the world and what is happening in various places. It was very interesting to hear about developments around the world.

The country most similar to our own, when it comes to the problems of packet infrastructure, is the USA itself. Whilst the US is the home of packet it is no longer the home of packet innovation. It is interesting to note that many of the recent advances in packet radio have come from Germany and Holland as well as the UK. It shouldn't escape your attention that the former two are *not* native English-speaking countries...

This has made for some interesting new developments. First came the G3RUH modems for 1200 and 9600bps operation for satellite use. England and AMSAT-UK have long been home to some very potent development talent in all aspects of amateur radio and this development should have come as no surprise.

The development of the G8BPQ packet switch code has also contributed much to the development of BBS systems and ready interconnectability of BBS systems as it has done to the development of NETROM type switch systems.

Germany has been responsible for first the Digicom and latterly the Baycom packet systems which rely on performing all of the functions of the TNC in the computer itself. Digicom is for use with the Commodore C-64 and Baycom is for use with IBM-PC systems. The development of PMP (Poor Mans Packet) in the USA parallels the development of Baycom, but has had little, if any, impact outside the USA.

On the TCP/IP scene there has also been a great contribution from the Europeans and the British. It is interesting to note that although Europe is the home of the OSI protocol standards there is an enormous wealth of TCP/IP talent resident there.

OSI versus TCP/IP

One interesting question I was asked repeatedly by the packeteers I spoke to in the USA was "What is the impact of the ISO-OSI (International Standards Organisation Open Systems Interconnect) protocols on packet radio in Australia?".

It was interesting that my reply was exactly the same as that of the Americans; that while OSI systems are the desirable toy of government and bureaucracy it is evident that IBM's SNA and the Internet/UNIX TCP/IP systems are the backbone of commercial networking in Australia, much as they are in the USA.

A recent survey of computer system users in the US showed that whereas OSI is expected to account for about four per cent of network traffic by late 1994 it is expected that TCP/IP will increase from around 15 per cent in late 1992 to around 23 per cent in late 1994. While over the same period the Novell IPX protocol (the transport protocol of the Novell NETWARE system) will increase from around 15 to 16 per cent.

My own informal surveying here shows much the same expectations. OSI in all respects is becoming important at the application level, but is not a huge force at the lower levels of application.

Who will survive?

At the same time we naturally turned our thoughts to what sort of traffic we can expect packet radio network systems to carry over the next few years. Almost universally it was accepted that amateurs would want to use the packet system to 'network' personal computers together. This would permit the operation of applications remotely, the remote use of file servers and archive systems as though they were part of your own computer and the application of sophisticated mail systems were seen as the greatest potential 'markets' we would see open up in packet radio in the next two to three years.

In looking at this sort of thing it is also interesting to see what sort of systems the amateurs were using and what they would want to add to the packet network. Most of the users polled at the HamVention were aware of 'X-Open' and similar remote graphics terminal applications and said that they would want to see them supported—this of necessity means TCP/IP facilities.

It was also interesting to note that about 70 per cent now had UNIX software. Due largely to the huge quantities

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of UNIX System V release 3.2 (SVR3.2) which has come onto the surplus market with the release of System V release 4 (SVR4). This means that a large number of amateurs wanting to use the packet radio system for networking already have TCP/IP capable systems operating. Those amateurs not using UNIX were likely to have Novell systems of some sort running and were looking for radio interfaces that are compatible with their systems.

At the same time we looked at the results of the same survey mentioned earlier, but this time the question was a little different: "What protocols do you expect to see growing in acceptance in the future?". Interestingly it was only TCP/IP and Novell's IPX that were seen universally as growth protocols for the future. OSI did not even rate a mention and most others were perceived to be of diminishing importance.

But what does this mean for the amateur community? Interestingly the feelings of the amateur community were much the same as the professional community. TCP/IP and IPX would predominate but no one system would achieve a strangle-hold.

Isn't it interesting!

To note that we are finally seeing the dissipation of the protocol wars of the eighties and a realisation that every group will do what is in its own best interests. It is also astounding to note that while end users consider BBS systems to be very important the new accent is on high performance systems and networking, not on end user systems.

This should mean that the future will see the development of capability and capacity in the packet system world-wide, not just the slavish adherence to the doctrine of the BBS.

New protocols needed

Now, before you get on your little red tricycle and start writing abusive letters and packet mail messages, I am not about to propose the demise of AX.25! GOT THAT CLEAR?!! Good.

Since the inception of the amateur packet network back in the early 1980s we have become rather stuck on one protocol, AX.25, which was originally intended for use on some satellites, but never even got that far.

The ARRL digital committee of the day added a few bits and pieces to it and unleashed on the world a great piece of work which has vastly outgrown our wildest expectations of what it would ever be called upon to do. But now the signs of advancing age and infirmity are starting to show, and new protocols for special purposes are now required, not only for the amateur packet community, but also for the wider packet radio community which is largely dependant on the amateur fraternity for its advances.

What's wrong with AX.25?

Well not a lot actually, *if* it is used for the purposes for which it was intended. But if we look at AX.25 we can see several shortfalls and we can also see ways to improve upon it for some applications.

AX.25 is now almost universally seen as 'the stock standard 1200 baud AFSK system' we see used on VHF packet. But that is not actually the case. The signalling tones (the American Bell 203 standard), the modulation scheme (AFSK in this case) and the method of connection actually belong to the physical layer of the protocol stack (whether we talk in OSI or TCP/IP terms).

Physical layer standards...

But as amateurs we have NO standards which define any physical layers for use with AX.25 which is a link layer protocol. So let's take a look at a few of those we do use and just what they are:

1. **1200bps FM-AFSK**. This is the standard physical layer with which we are all most familiar, the basic 1200bps system for VHF and UHF use.
2. **300bps FSK**. This system is used on HF for forwarding and for end-user access to systems. It is the standard HF packet physical layer supported by all the multi-mode data controllers such as the KAM, MFJ1278 and PK-232. The transceiver is used in SSB mode to give an FSK result.
3. **1200bps PSK**. This system, also devised for use on satellites and originally described as a modem design in *Ham Radio* magazine by Jim Miller, G3RUH, is used in some parts of the world for higher-speed HF packet on good quality paths. Bear in mind that in many parts of the world it is not legal to operate anything over 300bps on the HF bands.
4. **2400bps QPSK**. Originally devised by Kantronics, this technique is used with FM equipment on VHF and UHF bands. Also available from MFJ, DRSI and others, this technique is not uncommon on some 'private' nets but has not found high levels of acceptance.
5. **4800bps 'HAPN' PSK**. This scheme comprised a modem design which was intended for the original Hamilton (Ontario, Canada) Amateur Packet Network interface card used in the IBM-PC. This system can be used with slightly-modified 'off the shelf radios' but is not particularly common. A small group of users exists in Canberra and a few in Melbourne. They are the only ones I know of outside of Canada.
6. **4800bps, 9600bps and 19,200bps 0.3GMSK**. Known as the G3RUH design, this physical layer is commonly used in amateur circles at 9600bps and 19,200bps, but is also used commercially at 4800bps as well as the higher speeds. Originally proposed back in the 1970s as a way of conserving bandwidth for commercial systems this technique is very similar to the higher speed versions found in GSM telephones. Its use for amateurs was popularised by its adoption for satellite operation and the easy-to-build modem designed by G3RUH.

Other physical interfaces are used by more specialised operators, including systems operating at 56kbps, 64kbps, 256kbps and 2mbps utilising variety of radio system designs. While these are not directly applicable to end users, they are a necessary part of the arsenal for network developers.

These various physical layer systems are, as yet, totally unstandardised. Which leads to may and varied problems for implementors and users.

What do we need to do?

Well, one very obvious move would be for a series of standards to be drawn up for those physical layers which we already use. Obviously the use to which they are to be put will influence the link layers with which they are to be used and the MAC (media access control) methodology which is used, but we need to start getting ourselves a bit better organised.

But surely amateur radio is an *experimental* hobby isn't it? So why should we be bound by standards?

We don't need to be bound by standards, but standards do make the understanding of technically-complex issues easier and can also save a lot of work for implementors and designers. If the designer of the new modem publishes a standard then we all know what he is on about.

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All times are expressed in Coordinated Universal Time (UTC or 'z'). Add 10 hours for Eastern Standard Time, 9.5 hours for Central Standard Time, eight hours for Western Standard Time and 12 hours for New Zealand Standard Time).

The Catholics are coming!

That heading may be a bit of a variation on Paul Revere's famous catchcry, but is nonetheless appropriate when one considers the awesome power of Alabama's **WEWN**, owned and operated by a Catholic cable network group, and soon to reach its full transmitting capacity.

According to a letter received from *Bill Steltemeier*, president of the **Eternal Word Television Network** (**EWTN**), WEWN's third 500 kW transmitter should now be in regular operation, and the last was scheduled to hit the airwaves at the end of June.

Founded by a cloistered Franciscan nun, Mother M Angelica, EWTN was launched in the United States in 1981. The shortwave offshoot began on December 28, 1992, thanks to funding from wealthy friends, and now broadcasts in 20 languages — comparable with or better than many government sector stations around the world.

As promised some time ago, we are now able to publish the official transmission schedule, which varies somewhat from some of the versions which have recently been circulating:

Transmitter #1 (all beamed to North America)
2200-0200z English, **0200-0300z** Spanish and **0300-0700z** English, all on 7425 kHz; **0700-1000z** English on 9350 kHz; **1200-1500z** English on 9350 kHz; **1500-1600z** Spanish and **1600-1700z** English, both on 17,535 kHz; **1700-2200z** English on 13,615 kHz.

Transmitter #2
0000-0800z Spanish to Central and South America, English **0800-0900z** and Portuguese **0900-1000z** for Brazil, all on 9985 kHz; **1300-1400z** English and **1400-1500z** in French, Arabic and Portuguese for East Africa, on 17,535 kHz; **1500-2000z** in Spanish for Mexico and Cuba on 11,735 kHz; **2000-2100** Spanish and **2100-2200** Portuguese for Europe, both on 17,840 kHz; **2200-0000z** Spanish for South America on 17,760 kHz.

Transmitter #3
0000-0300z English for India on 15,650 kHz; **0100-0200z** Arabic to the Middle East on 13,710 kHz; **0200-0300z** in Russian on 12,160 kHz; **0300-0400z** Byelorussian on 11,580 kHz; **0400-0500z** in Czech and Slovak, **0500-0600z** in Croatian and Serbian, **0600-0700z** Polish, all on 9350 kHz; **0700-0800z** English for the U.K, **0800-0900z** Dutch for Europe, both on 11,580 kHz; **1200-1300z** English to the UK on 15,695 kHz; **1300-1400z** Chinese on 13,710 kHz; **1400-1500z** Arabic, **1500-1600z** English to the Middle East on 17,510 kHz; **1600-1700z** Dutch, **1700-1800z** French, **1800-2000z** English, **2000-2200z** French, all to Europe on 15,695 kHz; **2200-2300z** German on 13,615 kHz and **2300-0000z** Chinese on 15,650 kHz.

Transmitter #4
0000-0100z Albanian, **0100-0200z** Romanian, both on 9410 kHz; **0200-0300z** Ukrainian, **0300-0400z** Bulgarian, **0400-0500z** Lithuanian and **0500-0600z** Hungarian, all on 9370 kHz; **0600-0700z** English/French/Portuguese to Southern Africa on 13,710 kHz; **0700-0800z** Arabic/French/Portuguese to West Africa on 9430 kHz; **1200-1900z** Spanish to South America and the Caribbean, **1900-2100** English to South America and **2100-2200z** Portuguese for Brazil, all on 18,930 kHz; **2200-2300z** English and **2300-0000z** Portuguese, both on 11,820 kHz, beamed to Brazil.

Long a Protestant-dominated medium, shortwave now boasts three major Catholic stations; **WEWN**, **Radio Veritas** in the Philippines and the **Vatican Radio** itself. There are also plenty of minor players, such as Portugal's **Radio Renascenca** and a whole host of local broadcasters in Latin America.

Peace station news

Though not particularly well heard in the Pacific region, **Radio For Peace International** in Costa Rica is one of the more interesting private operations on the bands. In an interview with *Ian Macfarland* on **Radio Japan**'s *Media Roundup*, station head *James Latham* recently outlined some of RFPI's short and long term plans.

At present the station uses four low-powered shortwave transmitters, however a fifth, rated at 30 kW, is soon to come on line and should greatly increase coverage. RFPI is only now recovering from a major set-back in March 1993 when antenna arrays were totally destroyed in 125 mph winds. A rebuild has taken place, and all four transmitters can now operate in parallel once again.

From its establishment on September 17, 1987, RFPI has now grown to include five languages in its schedule; Spanish, Creole, English, Russian and German. There is also three hours of programming per day produced by the station's own women's section, and special UN segments are regularly featured. It is hoped in fact that one transmitter will be devoted full time to United Nations programming in the near future.

James Latham is well aware that listeners in the Pacific and Asia are at present not particularly well served by RFPI, however it is hoped that the World Peace University's latest project, the establishment of a shortwave transmitter at Salmon Arm in Canada, will rectify this problem to some degree. The possibility of using overseas relay sites is also being investigated, with an eye to complete global coverage.

Radio For Peace International presently operates 24 hours per day on 7375, 7385, 13,630 and 15,030 kHz. Some of these channels are in the upper side band mode, and there has also been some use lately of the 13 metre band channel, 21,465 kHz.

Hawaii update

All appears to be on track for **World Harvest Radio International**'s new Hawaiian shortwave operation, **KWHR**. According to staff at parent station **WHRI** in Indiana, the KWHR transmitter was to be shipped to the islands in June, with installation to take place in July and August. Don't be surprised if this station booms in here when established; Asia and Australia are the primary target area, and Hawaiian medium wave stations are even heard here with some regularity.

Aum Shinrikyo schedule

The Japanese religious group **Aum Shinrikyo** has published a schedule with its June newsletter for relay transmissions in English via **Radio Moscow** facilities. There are a whole host of available channels, so best just to concentrate on those intended for reception in Australia and New Zealand:

0430-0500z: 21,830, 21,790, 21,690, 21,670, 21,655, 21,625, 21,615, 21,585, 21,505, 21,490, 17,890, 17,865, 17,850, 17,740, 17,730, 17,710, 17,620, 17,570, 17,565, 17,560, 15,590, 15,560, 15,545, 15,415, 15,385, 15,375, 15,230, 13,775, 13,705, 12,045, 12,015, 12,010, 11,975, 11,970, 11,850, 11,785, 11,765, 11,710, 11,690, 9880, 9530 kHz
2030-2100z: 17,740, 17,655, 15,560, 15,415, 15,190, 15,170, 15,130, 11,985, 11,685, 11,675, 11,665 kHz

Note the use of frequencies adjacent to each other or in close proximity, ensuring that anyone with their radio switched on at the given times will be *sure* to stumble across the station. Don't expect to be too enraptured by the programming, however!

Czech Republic

Radio Prague has this schedule for English broadcasts:
0000-0030z To North America on 5930, 7345, 9485, 9810, 11,990 kHz
0100-0130z to North America on 7345, 9485 and 11,990 kHz
0300-0330z to North America on 5930, 7345, 9485, 9810, 11,990 kHz
0400-0430z to North America on 7345, 9485, 9810, 11990 kHz, to the Middle East and East Africa on 13,715 kHz and for the Middle East and South Asia on 17,535 kHz
0600-0630z for Europe on 6055, 7345, 9505 and 11,990 kHz
0730-0757z to the Pacific and Asia on 11,990, 13,600, 17,535, 17,725, 21,705 kHz, and to Europe on 6055 kHz
1030-1057z for Europe on 6055, 7345, 9505, 11,990, 15,355 kHz
1500-1527z to Europe on 6055, 7345 kHz, the Middle East on 13,600 kHz, Africa on 15,605 and 17,535 kHz
1700-1727z to Europe 6055, 7345, 9490 kHz, and Africa on 13,600, 15,605 kHz
2000-2027 and **2100-2130z** for Europe on 6055, 7300, 7345, 9490 kHz.

This information courtesy of *Andreas Volk*, in the *ADDX 'Kurier'*.

Uzbekistan

Radio Tashkent has slightly amended its evening broadcast schedule, introducing two new frequencies. Programs now go out in English from **1200-1230** and **1330-1400z**, Urdu **1230-1300** and **1400-1430z** and in Hindi **1300-1330** and **1430-1500z**. The current frequencies are: 7285, 9715, 15,295 and 17,815 kHz.

Programs for the hobbyist

In between your four-weekly fixes of broadcast information in this esteemed publication, there's no need to go 'cold turkey' completely. Several shortwave stations carry programming specifically tailored for the DX enthusiast as part of their regular schedules, though the quality varies considerably, as does the coverage.

It would take a couple of pages to give the complete list of everything that's available, so I've prepared a summary of the more useful segments, showing the times and frequencies most convenient to listeners in Australia and New Zealand:

Australia: (**Radio Australia**) *'Communicator'* — Tuesdays 0930z 21,725, 15,170, 13,605, 9580, 5995 kHz; 1130z 21,725, 15,170, 13,605, 9710, 9580, 9510, 7240, 6080, 6020, 5995 kHz. Also at 1530, 1730 and 1930z. This one rarely gives frequency information, and can be classified more as a 'general' media news segment, particularly covering developments in the Pacific region.

Belgium: (**Radio Vlaanderen International**) *'Radio World'* - Saturdays and Monday (repeat broadcast) 0635z 9925, 5910 kHz; 1305z 15,530, 17,515 kHz. Loggings from an Antwerp-based contributor, with a heavy slant towards European stations. A useful program but beware the occasional glitch, such as the recent assertion that La Paz is the capital of Peru!

Ecuador: (**HCJB**) *'DX Partyline'* — Saturdays 0742, 1010z 9745 and 11,925 kHz. A folksy 40 minutes of loggings and introductory instruction for newcomers. Especially valuable for the occasional Latin American news, but taped segments from various North American DX groups are truly awful. Another program from HCJB, *'Ham Radio Today'* will be of interest to many ARA readers, and goes out Wednesdays at 0800 and 1030z on the same frequencies as above.

Guam: (**AWR Asia**) *'DX Asiawaves'* — Sunday 0215z 13,720 kHz, 1815z 13,720 kHz, Saturday 2315z 15,610 kHz. Compiled by members of the *Australian Radio DX Club* and sent electronically to the station to ensure timeliness. Highly recommended, but it's clear the announcers have no idea about the subject matter and often get completely tangled up with their pronunciation of station names and locations.

Japan: (**Radio Japan**) *'Media Roundup'* — Sunday 0530z 17,810, 15,410, 15,230, 7230, 6085 kHz, 1430z 11,815, 9750, 9535, 11,735, 11,865 kHz, 2130z 15,430 kHz (plus others that yield poor results). Inexplicably dropped from the 0930z timing in May, the only airing really convenient to eastern states listeners with adequate reception. Features useful background information and frequency tips from specialist Japanese groups, and receiver reviews courtesy of *'Passbook to World Band Radio's'* Larry Magne.

Republic of Korea: (**Radio Korea**) *'Shortwave Feedback'* — Sunday 0840z 13,670 kHz, 1035z 11,715 kHz. Mainly a mailbag-type program, however there are brief segments provided by noted US DXer William Matthews, including some loggings from the *'Fine Tuning'* group on alternate weeks.

Netherlands: (**Radio Nederland**) *'Media Network'* — Thursdays 0750z 9630, 11,895 kHz; 0950z 15,470, 12,065, 11,895, 9720 kHz; 1350z 17,610, 15,150, 13,700, 9890 kHz. Sometimes a little smug, responds vehemently to perceived criticism, however up there with the best and certainly required listening. Its presenters will be quick to point out that it is not a 'DX program' as such, though the slant continues to be to-

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wards developments on the shortwave scene.

New Zealand: (**Radio New Zealand International**) *'Mailbox'* - first and third Mondays 0430z 15,120 kHz, repeated following Thursday 0830z 9700 kHz. Loggings from old-timer *Arthur Cushen*.

Sweden: (**Radio Sweden**) *'Media Scan'*—Tuesdays 1230z 21,500, 15,240 kHz, 2230z 11,910 kHz. This one was *'Sweden Calling DXers'* in an earlier incarnation, and the grand-daddy of them all. Sadly, now concentrates mostly on satellites, with a heavy emphasis on Europe, and is only of nominal value to us.

Switzerland: (**Swiss Radio International**) *'Swiss Shortwave Merry-Go-round'*—Saturdays 0900z 9885, 13,685, 17,670, 21,820 kHz; 1100z 13,635, 15,505, 17,670, 21,820 kHz; 1300z 7480, 11,690, 13,635, 15,505, 17,670, 21,820 kHz. No frequency information, but a tried and true formula presented by 'the two Bobs'. Mainly revolves around answers to listeners' technical questions.

United Kingdom: (**BBC World Service**) *'Waveguide'* — Saturdays 1030z 6195, 9740, 11,750, 15,070 kHz plus a few others. Brief segment concentrating on the basics of shortwave reception.

United States:

(**Voice of America**) *'Communications World'* - Saturdays 1010z 5985, 11,720, 15,425 kHz; 1210z 6110, 9760, 11,715, 15,160, 15,425 kHz; 2110z 11,870, 15,185, 17,735 kHz. A magazine-style program, covering communications generally. Occasionally gives some insight into the operations of the VOA itself, but be prepared to sit through plenty of talk about telephones and computers.

(**WWCR**) *'World of Radio'*—Fridays 2115z, Mondays 1239z Tuesdays 1130z, all on 15,685 kHz. Presented by freelancer, *Glenn Hauser*, whose distinctive style makes no bones about his views on the subject matter. A must, but reception is patchy during our winter.

Again, there are more frequencies and times available for many of the above programs, but this list should serve as a starting point.

Hungary

According to a report on *'DX Daily'*, **Radio Budapest** has been announcing a new schedule since June 1. English to Europe is now listed **2100-2200z** on 6110, 7220, 9835 and 11,910 kHz, and the North American service is **0200-0300z** on 5970, 9835, 11,910 and 15,220 kHz.

Budapest's 75 metre band channel of 3955 kHz is scheduled for services to neighboring countries from **0300-0530** and **1500-1730z**.

Romania

A schedule for **Radio Romania International** has come to hand, and shows the following English broadcasts:

0200-0300z and **0400-0430z** to North America on 6155, 9510, 9570, 11,830, 11,940 kHz
0530-0600z to Africa on 15,340, 15,380, 17,720, 17,745, 17,790 kHz
0632-0641z Europe on 7225, 9510, 9665, 11,810 kHz
0645-0715z Pacific on 11,775, 15,250, 15,335, 17,720, 17,805 kHz
1300-1400z Europe on 11,940, 15,365, 17,720, 17,850 kHz
1430-1500z Asia on 11,775, 15,335, 17,720 kHz
1730-1800z Africa on 15,340, 15,365, 17,745, 17,805 kHz
1900-2000z Europe on 9750, 11,810, 11,940, 15,365 kHz
2100-2200z Europe on 7195, 7225, 9690, 9750, 11,940 kHz

This information sourced to *Andreas Volk*, in the *ADDX 'Kurier'*.

China

Members of the *Asian Broadcasting Institute* report that **China Huayi Broadcast Company** has amended its schedule, increasing its daily output by one hour. The station is now on air from **0255-0600** and **0955-1600z** on 666 and 6185 kHz, plus FM frequencies.

The address for correspondence is China Huayi Broadcast Co, PO Box 251, Fuzhou, Fujien Province, 350001, Peoples Republic of China.

CIS relay news

Radio Deutsche Welle's relay transmissions via transmitters in the Commonwealth of Independent States are scheduled as follows for the 'Z93' transmission period:

German **1000-1400z** 15,560 kHz (N), **1400-1800z** 12,055 kHz (S), **2200-0000z** 11,795 kHz (N); Japanese **1100-1150z** 15,525 kHz (I); Chinese **1200-1320z** 15,525 kHz (N); Indonesian **2230-2320z** 12,045 kHz (N); Bengali **0100-0150z** 12,045 kHz (N); Urdu/Hindi/English **1430-1650z** 9875 kHz (N); Pashtu **0300-0350z** 15,560 kHz (S); Dari **0800-0850z** 17,675 kHz (S); Persian **1000-1050z** 17,735 kHz (S); English **0200-0250z** 15,560 kHz (S).

Sites: (**N**) = Novosibirsk, (**I**) = Irkutsk, (**S**) = Samara-Zhigulyovsk.

This data supplied by Deutsche Welle's technical department, and published in *'Shortwave News'.*

The **BBC** also makes use of CIS facilities, now listed with this plan:

9845 kHz (Irkutsk) - **2200-2300z** Chinese
12,055 kHz (Tashkent) - Bengali **0030z-0045z**, Hindi **0045-0135z**, Urdu **0135-0200z**
12,055 kHz (Chita) - **2200-2300z** Chinese
15,460 kHz (Chita) - **1000-1300z** Chinese
15,460 kHz (Tashkent) - **1330-1410z** Bengali, **1410-1500z** Hindi, **1500-1545z** Urdu, **1630-1700z** Bengali

This schedule via *Dan Ferguson* in the US.

Tuning tips

• *Gavin Hellyer* of Ararat, Victoria advises that he has been hearing **Radio Iraq International** on the unusual frequency of 17,940 kHz, in English at 0250z sign-on.

There are also reports of Baghdad in English at 2100z on 13,680 kHz, however this channel is badly jammed.

• The Ecuadorian station **Radio Centinela del Sur** in Loja was once a difficult catch in Australia, when it shared a frequency with Papua New Guinea's **NBC**, 4890 kHz.

Our fortunes have taken a turn for the better, however, and this one now operates on 4770.8 kHz, where it provides useful signals at 1100z.

• Down Bolivia way, the folk have a habit of naming their radio stations after previous Popes.

Not only do we have **Radio Juan** (John) **XXIII** on 4965 kHz, but also **Radio Pio XII**, the latter now providing regular reception in this part of the world. The frequency is 5945.8 (variable), and a good time to catch them is 1100z. Oh, and you can also hear Juan XXIII at present, best at 1000z.

• *Michael Rolph* reports reception of **WFLA** in Florida on 25,870 kHz at 2330z, whilst on DXpedition at Bargo, south of Sydney.

This frequency is believed to relate to some sort of feeder service, and is noted in the FM mode. WFLA is a local medium wave or FM station in the US. A little bit off topic, but interesting nonetheless and indicative of some reasonable high frequency reception from time to time in the colder months.

• *David Martin* of Mansfield, Victoria, sometimes known as the resident guru of 'OZ DX', has been hearing the Italian private station **Tele Radio Stereo**, from Rome.

The frequency is 6012 kHz, and reception doesn't seem to pick up until around 2200z. David noted this one until a 2320 fade-out.

• Also from *Michael Rolph*'s Bargo trip, a logging of the rare Guatemalan, **La Voz de Atitlan** on 2390 kHz. An identification announcement was noted at 1107z, in a program of older-style music.

There aren't too many Latin American stations on 120 metres (the 1993 'World Radio and TV Handbook' lists eight), and digging any of them out from under suburban noise is generally an unachievable feat!

• Mid-winter heralds earlier fade-ins on the lower frequencies in our afternoons, and some interesting signals often appear on 49 and 41 metres in the period from 0300 to 0400z.

This includes stations in the more easterly parts of Europe, ones which don't quite make it at this time during other parts of the year. One such station is the **Croatian Radio** at Zagreb, which is audible on 5920 kHz at 0330z, in parallel with 9830 and 13,830 kHz. Another has been **Radioropa Inpho** on 5980 kHz, a German satellite radio service which has recently been conducting test transmissions on shortwave via facilities in the Czech Republic. Reception of this one has also been quite good at 0330z.

United States

In *'Australian DX News', Patrick McDonald* gives this schedule for religious station **KJES**, in Vado, New Mexico:

1300-1600z 11,715 kHz for Canada and Mexico, **1800-1900z** 9510 kHz for Australia, **2000-2100z** 9510 kHz to Mexico. Programming is in English and Spanish.

Worth a look is the Australian service — KJES has thus far proved elusive to most Australian-based listeners.

In addition to preparing **Amateur Radio Action**'s shortwave notes, Craig Seager is a life member of the **Australian Radio DX Club** Inc. and edits the 'Shortwave Trail' section of the club's monthly bulletin.

A.J&J Coman

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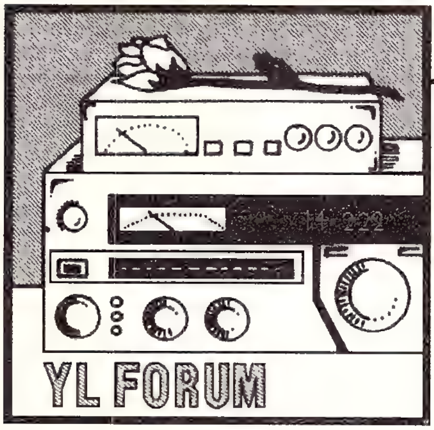


By Kirsti Jenkins-Smith, VK9NL
PO Box 90, Norfolk Island, South Pacific 2899

Antennas I have known...

In the beginning there was the dipole. Strung over the roof and chimney of the house and attached to two bits of fishing line weighed down with chunks of firewood, my dipoles for 10, 15 and 20 metres worked wonderfully well. People kept asking: "What are you running there? You are *booming* in!"

The 80 metre dipole was strung between two long bamboo poles tied to the garden fence - like ships' masts, really, giving the place a decidedly maritime look; as if we were about to sail off into the unknown at any minute. The sunspot cycle was at a peak, bringing the whole world into my FT-301. And so it was that all was well.

Next came Jim and a four-element phased array for 40 metres. It, too, worked well with a quick switching arrangement for working the four corners of the globe. Standing out in an unprotected area of the paddock we could watch the elements bend almost double in the persistent nor'easterlies or sou'westerlies depending on the season. From time to time the stress became too much and one or more elements would crumble gracefully to the ground like a dying swan. If it wasn't the wind, the cows would do their best to tug on the guy ropes until they brought the element down, but usually it was the wind. After umpteen replacements Jim finally replaced the whole lot with tubing of such strength that no guys are needed. The elements sway and tremble, leaning back and leaning forward, but once the wind ceases, there they are — tall and straight, proudly gazing out over the South Pacific.

But, long before that, while we were still fighting cows and cyclones, Jim got this marvellous idea for an 80 metre vertical which would have place of honor smack in the middle of the 40 metre array. My heart was not in it. I reckoned we had enough trouble with the 40 metre elements. An 80 metre vertical? Crazy!

There is something called fighting against the laws of nature and this fight went one for some time with visiting amateurs being conned into 'giving a hand', the XYL clearly not being up to the job.

I can't consciously remember the 80 metre vertical in operation. It was either very brief or maybe it never happened — like the 160 metre vertical we tried to raise on Heard Island when Mother Nature won the day.

Meanwhile we had of course got up a beam; a Wilson Tri-bander on top of a tower which Jim would climb with relish. I say 'with relish' as he *did* seem to enjoy himself. I, on the other hand, would be somewhere in the house whimpering and longing for my dipoles which never had to be climbed. "You are not a *proper* ham unless you can climb a tower!" admonished one OM in a letter to me.

I have forgotten the reason why he wrote to me at all, or maybe *that* was the reason — to tell me that I was not a proper ham. It brought to mind how I was once told that in order to learn to ride a horse (properly) one must sustain a number of falls. I relinquished the horse riding but, years later, older and wiser, I reckoned I could be a 'ham' without falling off the tower a number of times, or even tempt fate by climbing it.

Discussing the whys and wherefores of tower-climbing with my YL friend Laila WA4ZEL one day, she yelped: "Don't do it! I know what it is like! I tried it once and only got a few feet off the ground when I froze! I could not move, just screamed for help until someone came and got me down." Well, being plastered around the tower like a giant jellyfish was a sight our neighbors would just have to do without — and poppycock to the letter-writer.

Refinements to all of our antenna systems involve radials laid out on (or just under) the ground, doubling as tripwires for nosy sightseers. Other refinements involve rotors and beam indicators. All good stuff when they work, but high winds can cause curious displacements of the continents according to the beam indicator. And so, an old-fashioned compass comes in handy after a storm. Of course, some storms are worse than others, and it has happened that the beam has come down in a grinding heap. But, like ants rebuilding their hill after the giant foot of Man has kicked it about, so do the radio amateurs of this world resurrect antennas on an ongoing basis. The beam is thus never long out of action. Soon the public crane will arrive, Jim climbs the tower and the beam is lifted up to be put in place once again.

Over the years we have had antennas that I never got to know. Once we had a 'Bobtail Curtain.' I only remember the name of it because at the same time there were some strange bits of wire dangling around with insulators tied to the ends. I thought that was the 'curtain'. Well, you know those beaded curtains used in doorways! And there have been many antennas for 160 metres. As I treasure the innards of my ears, I never work 160 metres and so never took much notice of the long wires sometimes stretched along fences or high into pine trees. They were 'Jim's antennas' and that was the end of it. But I could not ignore the Log Periodic.

The Log Periodic was long in the making. It cluttered up the parking area for months. The cows used to come and kick it around and, as far as I was concerned, it was a nuisance, because if I wanted to buy a load of firewood the delivery truck would have to drive across the antenna. Now that's something which would upset Jim and made him cranky!

About a year ago we finally struggled down to a fenced area with the beam and heaved it over the fence, out of harm's way. Spiritually uplifted, I ordered some firewood the very next day, a wise move as the beam had mysteriously returned itself to the parking area only a few months later.

Jim spent some time tinkering with the beam and tinkering with the second tower which had stood idle for ages. I watched my dwindling stocks of firewood and the weather patterns over the South Pacific. Would the beam be uplifted before the cold weather struck? It was a race against time, but finally everything was in order. Early one fine sunny morning in May strong men came up with the crane and gave Jim a hand with the monster beam. Over the paddock fence it went and was laid carefully on the ground under the tower. I don't like to look when Jim climbs towers so I deserted the scene and was gratified to find the Log Periodic securely in place and Jim safe and sound in the house when I returned home.

The Log Periodic is for the WARC bands. It does not look as monstrous up there in the clouds as it did on the ground and I have to admit it is the only antenna I have seen which can be described as 'beautiful'.

But, what with the tribander, the 40 metre array, the shunt-fed tower, the whatever-it-is on 160 metres, the six metre beam lolling over the roof, the Log Periodic and the vertical standby, I wistfully think of the beginning of it all: "Why don't you become a radio amateur? All you need is a second-hand rig and a piece of wire..."

☞ from page 41

I didn't understand what Jim Miller had done with his 9600bps modem until I 'reverse-engineered' the thing and the wrote a specification of my own. To the best of my knowledge, neither Jim nor Amsat have ever published a 'standard' for their modulation technique and modem design. So all of the modem designers who have produced 'G3RUH type' or 'G3RUH compatible' modems have done so purely by ensuring that they work with the G3RUH original design.

This system of promulgating a standard is highly risky. It can lead to all sorts of incompatibility later and all sorts of arguments; much easier to get things down on paper first, isn't it?

What next?

We then need to look at all of the link layer protocols used by amateurs and see that they are codified in some way and are readily available to developers all over the world in some form, either physical or electronic.

Then...

We need to start evaluating our needs for protocols for other uses. It would seem that neither ROSE nor Net/ROM has captured the imagination of amateur packet operators in huge numbers. Both have a place in providing user services but I have yet to see a formal standard for either of these products!

But more particularly we need to look at the building of the network and see what we need to develop to make it work. We have AX.25 as a 'multi-point to multi-point' link layer for end-user type access. But AX.25 is seriously deficient when it comes to 'point to multi-point' or 'point to point' applications. A 'point to multi-point' protocol has been developed locally for commercial operation which will shortly be proposed as a standard for the amateur service for those applications. A point to point protocol exists within the Internet protocol suite but has so far been little used.

But what else do we need? We need to start developing a world-wide discussion of what we see as necessary. But more importantly we need to start implementing some of these things. Over the years a huge number of new protocols for a variety of purposes has been proposed for the amateur community. But I have yet to see any of them implemented and distributed for people to try out in operational systems.

On a local basis we need to asses our own needs, look for the products (not necessarily commercial); we need to fill those gaps and if none exists we need to invent it for ourselves.

Link layer protocols...

I have already said that we need to look at link layers for network building, not for replacing AX.25 at the most fundamental level, but to support a variety of systems, features and capabilities that make a network useful.

Media Access Control arrangements...

We need to look at mechanisms other than the methods we presently use with AX.25. Media access control is the mechanism we use to access the radio channel in our case, which carries the data.

This arrangement is characterised by the mechanism we use to detect collisions, the method used to determine when we access the channel and the method used to actually determine if another user is presently accessing it.

Several systems exist already including the 'slot-time and persistence' mechanism found in most TNCs and proposed by Phil Karn, KA9Q, and the various DCD (data carrier detection) schemes used in TNCs and by some add-in modules.

Higher level protocols and applications

On top of our present packet infrastructure we presently only offer very limited services to our user base. However this need not be the case.

International standards already exist for electronic mail, file transfer applications and remote computer usage. Any of these can be added to a packet radio system, such as we have, with very little difficulty. But only where we offer a clearly-defined platform to developers.

This does not mean limiting our options, nor does it mean that some users will be pushed out. Far from that, it should mean that, when it is easy for a developer in one place to know what has already been done and what services are considered 'standard', then he can easily add services, features and facilities to whatever work he does in a very efficient fashion.

But why did I say all that?!!

See you next time. 73 from John.

The Science Page

By Paul Butler, VK3DBP

Write to The Science Page,
Amateur Radio Action,
GPO Box 628E,
Melbourne, Victoria 3001

SCIENCE

Optoelectronics

In this column over the last few months, we have been looking at the physics of solid-state devices. Last time, the differences on a atomic scale between conductors, semiconductors and insulators were described and the notion of a band structure was used to explain the workings of a semiconductor diode. This time, we'll take the discussion further and see how some substances can be made to emit **light**. Research in this area has enormous implications for the design of integrated circuits, as we shall see.

Atoms in bulk materials have internal energy states which are different from those predicted from theory for single atoms. The most important feature when atoms are found in bulk is the grouping of energy levels into a valence band and a conduction band. Electrons are normally found in the valence band, but only those in the conduction band are free to move from atom to atom and so contribute to electrical conductivity. As we have seen, metals have electrons in the conduction band, insulators do not. Semiconductors have a band gap between the valence band and the conduction band which can be modified using small amounts of a doping impurity, giving rise to their characteristic properties.

Light shining onto the surface of a semiconductor provides energy which can allow some of the electrons held in the valence band to cross the gap into the conduction band. The energy is released again as the electrons fall back across the gap and the width of the gap determines the wavelength of the light. In some cases, electrons crossing the gap cause a photocurrent to flow. In others, a current flowing through the semiconductor generates light by the process of electroluminescence. Light emitting diodes work in this way. The branch of electronics which makes use of this behavior is known as **optoelectronics**.

Gallium arsenide is very efficient at converting electricity into light and so it is often used for optoelectronic applications. The main problem with gallium arsenide, however, is that it is so expensive. Silicon is much cheaper and has become the dominant material used in electronics. It is abundant and its physical and chemical properties are such that it is extremely useful in microcircuit fabrication. But these same properties of silicon, as they are currently understood, mean that it is not very efficient when used for optoelectronic devices.

In gallium arsenide, electrons readily fall across the energy gap, making the conversion of their energy into light quick and efficient. In silicon, however, the conversion is indirect, involving atomic vibrations called phonons. The challenge for researchers has been to modify the structure of silicon in a way which will produce direct energy conversion, as in gallium arsenide.

It is now known that the energy levels in extremely small structures are much more likely to produce efficient energy conversion. By small, we mean VERY small! A long, thin silicon structure called a 'quantum wire' is needed, which has a diameter of 4 nanometres, about one twenty-thousandth of the diameter of a human hair. A 'quantum dot' is a tiny crystal of silicon of similar dimensions. Current methods are limited, however, to manufacturing structures around 100 nanometres in diameter. The way to success in this field, therefore, appears to lie with a material called porous silicon.

When bulk silicon is made, the anode of a electrochemical cell (using hydrofluoric acid as the electrolyte) an apparently smooth, reflective surface is formed. Close inspection shows that the surface is, in fact, covered with tiny holes or pores. By slowly etching the surface, a structure can be created which is about 20 per cent silicon, the rest being pores.

This structure should then contain large numbers of the quantum wires which are the prerequisites for efficient electroluminescent silicon.

According to a recent *New Scientist* article, techniques are being developed which will eventually allow microcircuit construction using porous silicon. The actual mechanism is not known; in fact, there currently no less than four competing theories about what is going on. But techniques are being steadily developed to produce porous silicon structures and put them to good use.

One potential area of use is in very large scale integration (VLSI) integrated circuit construction, in which enormous numbers of electronic components are packed into tiny spaces. A problem with VLSI is that the connections between circuits are electrical and so limit performance. Using porous silicon, devices could be made to glow and so communicate with one another using light.

Quantum wires less than 1.5 nanometres wide will be needed here—the electroluminescent glow stays around too long in thicker wires for the high-speed switching needed. The theoretical minimum size is that of a single molecular polymer but these incredibly tiny structures are too small to be stable. Porous silicon could also be used in the manufacture of large-area and high resolution displays. Research is now continuing in order to establish practical construction methods for these amazing molecular devices.

(See *'A glowing future for silicon'* by Leigh Canham, in New Scientist, 10 April 1993, for more information about the state of the art in this important area of research.)

INVESTIGATING

More satellites

Last month's **Science Page** took a look at SAREX, the series of amateur radio experiments carried on the US Space Shuttle. For readers who are keen to have a go with SAREX, the key is to keep an eye on packet radio and telephone bulletin boards. Information on SAREX is plentiful but it is important to keep up to date with events, because changes do occur and often at short notice. Remember that SAREX is NOT the primary purpose of Shuttle missions, even if we think it should be!

Luckily, there are lots of other spacecraft to keep us busy between Shuttle missions. Some of them use modes of communication far too esoteric for me to get involved with — I shy away from computer-steered antennas, high-speed modems and the like. My earliest, and in many ways most satisfying, encounters with satellites were with the early UoSat satellites which were built, launched and operated by a team at the University of Surrey in England. UoSat 1 (or UO-9, as it was designated by AMSAT) decayed a year or two ago but UoSat 2 (UO-11) is still around. The UoS volunteers are busy with later UoSats, however, so UO-11 gets somewhat neglected.

My recent foray into Shuttle-chasing led me into looking more closely at two other easy-to-use satellites, the manned Russian space station MIR and a more recent AMSAT, AO-21. MIR caught my attention because it was transmitting on the same down-link frequency as SAREX. This is no longer the case, according to recent packet bulletins from AMSAT. The latest reports indicate that MIR is now using 145.85 MHz, not 145.55 MHz as was the case (and still is for subsequent SAREX missions).

MIR is a manned space station occupied by a succession of Russian cosmonauts, quite a few of whom are amateur radio operators. They are often in orbit for quite a while (the space station stays in orbit and the cosmonauts arrive and depart by space taxi!) so they do have time to hold conversations. But, and it is a big BUT, they will generally only converse in Russian. This means that if you speak Russian, you stand a good chance of getting through, if they are not busy with their professional duties or asleep. However, for the essentially monolinguistic amateur, radio conversations with MIR are out.

So what's the alternative? Well, as with the SAREX setup, MIR does operate a packet radio station, complete with a store-and-forward messaging system. It uses the standard AX-25 1200 bits per second packet protocol, which can be decoded using an ordinary terminal node controller (TNC).

On SAREX, the machine operates as a robot and gives an automatic response to CONNECT requests. The MIR packet system operates more like a terrestrial packet radio bulletin board system (PBBS), that is, you connect to it and work through a system of menus to read messages, send mail, etc. The problem with this is that a Mir pass can be quite short, perhaps 10 minutes, during which signals may not be 100 per cent and other operators may be competing for MIR's attention.

Don't be put off, however, by the above comments. The signals from MIR are strong enough to make it an easily-identified satellite and simply hearing the cosmonauts talking is interesting in itself. The challenge of connecting to the PBBS is the next stage and quite achievable. So, why not have a go...?

Another satellite I have found well worthwhile pursuing, as I said above, is AO-21. The signals from this spacecraft come booming into a simple antenna such as a turnstile reflector (T-R) or even a simple discone, which does not have a brilliant response skywards but works well enough for this application and, of course, does not need steering. To get the most out of AO-21, you do need a bit more get-up-and-go than an omnidirectional antenna will provide. But we are talking here about getting started with some of these satellites — the refinements can come later!

The distinctive feature of the output from AO-21 is its digital voice repeater, which transmits on 145.987 MHz. This clever piece of technology performs three separate functions. For part of the time, it relays a digitally-recorded, spoken message. This appears on the received signal as a very strong, clear human voice, not a robotic voice. An earlier satellite, DOVE, was designed to relay digitised messages of peace to the world-wide community but unfortunately things did not go to plan and DOVE's voice never really got going. AO-21 now does some of the work DOVE was meant to do, and so it provides an interesting signal for us to listen to. Invite the neighbors in to listen — they'll surely be impressed!

The next part of AO-21's cyclic repertoire is a telemetry stream. This lasts for a minute at the most. I have not got around to decoding this telemetry but understand that it is in packet format. (I would be interested to hear from readers who have made sense of AO-21's telemetry, so out with the pen and paper.)

To the listener, it sound like a raucous stream of tones, very loud and distinctive, so it is valuable in helping to identify AO-21.

The third part of the cycle from AO-21 on this frequency is the output from a digital transponder. It accepts an input on 435.016 MHz, but can handle only one signal at a time. The audio received via the uplink is passed through the transponder in digitised form and then re-transmitted on the downlink frequency of 145.987 MHz. This FM voice repeater is available for six minutes out of every ten.

The fact that the uplink and downlink are on two different bands can be a bit of a problem. I have access to both 2m and 70cm Kenwood transceivers, so the electronics side of it was not a difficulty. I used them in conjunction with a couple of lightweight beams from Maspro. It's just as well they were lightweight, too, since I used them in a hand-rotated configuration.

An eight-element Yagi on 2m and a 14-element Yagi on 70cm provided plenty of gain for this application. I mounted them side-by-side on a horizontal length of aluminium tubing which was arranged at right angles to a pole mounted vertically.

The trick here was to get the whole thing stable while still being able to rotate the pole and the horizontal tubing so that I could point the antennas at any bit of the sky!

Having run a tracking program to get a predicted time of acquisition of satellite (AOS), I printed out the time, compass bearing (azimuth) and elevation of the satellite at five minute intervals for the pass. It then became a juggling act — point the antenna to get the best signal, adjust the receiver to compensate for a slight doppler shift, then talk into a hand-held microphone while shifting the uplink frequency slightly until I could hear my own signal coming back.

But come back it did, so I was able to talk to some of the hardy regulars using AO-21 who were located in New Zealand and Tasmania. I had heard that AO-21 was difficult to work but the signals held up quite well, except for fading due to the fact that my antennas were not crossed Yagis, as they should ideally be for this application. A more comprehensive installation would have improved things, no doubt, but I'm very much one for trying an investigation, then moving on.

The Keplerian elements needed for tracking MIR, AO-21 and all the other satellites you can think of are available from BBSs and PBBSs, and there are quite a few good programs around which turn these elements into useable predictions of satellite sightings. I have used Instant Track quite successfully and may get a chance to say more about this and other excellent tracking programs in the **Science Page** another time.

TECHNOLOGY

Packet radio networking

I have just enough space left to talk a little more about some of the intricacies of packet radio software. My requirement for current information about satellites led me back to packet radio after a few years absence. I then discovered that networking was the big issue amongst packet radio operators, so I thought it was time to look a little more closely. Since Bryan, VK3BLW is just down the road from home, a good starting point was the VK3BLW PBBS. This is available on 147.600 MHz, along with other PBBSs such as VK3BBS, accessed now only through the VK3RPS packet switch.

On this frequency, I had been using the normal AX-25 packet protocol and finding the channel rather busy. This was not surprising, since the two main 2m packet frequencies, 147.600 MHz and 147.575 MHz, are always flat out servicing everyone who wants access to PBBSs. This was particularly a problem when trying to download any sizeable executable file using the PAKET software reviewed in this column last month. Was there an alternative to fighting it out with everyone else?

I had seen packet traffic on 144.900 MHz but could not decipher it. Bryan explained to me that this is the frequency used by the TCP/IP packeteers, so I acquired a copy of the relevant software and settled down to a serious bout of thinking! TCP/IP is not an exercise for the faint-hearted, but it does provide an interesting challenge for the long winter evenings.

TCP/IP, by the way, is an acronym for two distinct packet protocols. A protocol is an agreed format which establishes the way in which data is packaged up and sent from one computer to another. AX-25 is the common packet protocol for amateurs, modelled on the X-25 protocol used by computer people in the real world. TCP stands for Transport Control Protocol, IP for Internet Protocol, and a good description of each, and quite a few others, is contained in Chapter 19, *Digital Communications*, in the *ARRL Handbook*.

The main potential for solving my problem was that, using TCP/IP software, I could set up the computer to download the information I wanted (eg the AMSAT files containing Keplerian elements) without any further intervention.

As it turned out, I could even set up the software using DesqView, a multi-tasking package, so that I could run other programs at the same time. As I write these very words using WordPerfect, I can see in a small box on my screen the conversation going on between my own computer and VK3BLW's, as new AMSAT files are downloaded.

So what was involved in getting TCP/IP going? Well, I have to say that without VK3BLW's help, I would still be staring at a blank screen! The great thing about amateur radio, though, is that (nearly) everyone is prepared to help (nearly) everyone else, so with a few visits and several telephone calls, I was away to flying start.

The first requirement is a TNC which supports KISS mode. KISS stands for Keep-It-Simple-Stupid, and refers to a mode of communication between the computer and the TNC in which the computer does all the hard work and the TNC just sits back and enjoys the ride. My PacComm TNC-220 does not support KISS mode, but my AEA PK-232 does, as does the TNC-220+ lent to me by VK3BLW.

The 220+ was set to wake up in KISS mode so that was fairly easy to use. I prefer to use the PK-232 without an internal battery, however, so that I can easily get it into a predictable state by turning the power off and on again. It therefore needs a few extra commands initially to get it into KISS mode.

The software consists of a version of NOS, or Network Operating System, written by Phil Karn, KA9Q and Gerard van der Grinten, PA0GRI. Initially I installed it into the root directory of my computer as instructed. I was later shown how to install it much more tidily by using the DOS SUBST command to create an E: drive and putting the software into its root directory. Further directories are needed off the root directory, and these eventually contain downloaded files and other goodies.

Running the program by typing the magic word NET calls the configuration file which tells the computer and the TNC what's going on. Here is one definite area in which you need an expert handy — NOS is not the easiest language to follow! However, VK3BLW did his stuff and up came the NET> prompt. Now what?

The next step is to tell the software which newsgroups you are interested in. I chose PACKET.AMSAT, since it was here that I expected to find the satellite data I was after. The transceiver was already tuned to 144.900 MHz, so away we went.

Starting the software initiates a 'kick', which prods the local server, in this case VK3BLW-1, into life. It is asked whether it has any files in the PACKET.AMSAT newsgroup, to which it replies in the positive. My computer says 'Send them, then' and the remote server does just that.

As the files come in, they are tucked away on my hard disk, in a file called AMSAT.TXT. I can then use a text editor to view the file, or make use of VK3BLW's version of BM, or Bdale's Mailer. This list the titles of all the bulletins in the AMSAT.TXT file and lets me read any individual file, or all of them one after the other if I wish.

The clever thing occurs two hours later. If the computer is left on (to play a game or write another article in a DesqView window), an internal timer will 'kick' VK3BLW-1 again after a while and ask if anything new has come in. The software keeps track of the date and time of my last 'kick' and only collects new items that have arrived since then. Clever, eh?

The same software package can collect and deliver mail for me using SMTP, the Simple Mail Transfer Protocol, or download files using FTP, or File Transfer Protocol. The newsgroup transfer is done using NNTP, or Network News Transfer Protocol.

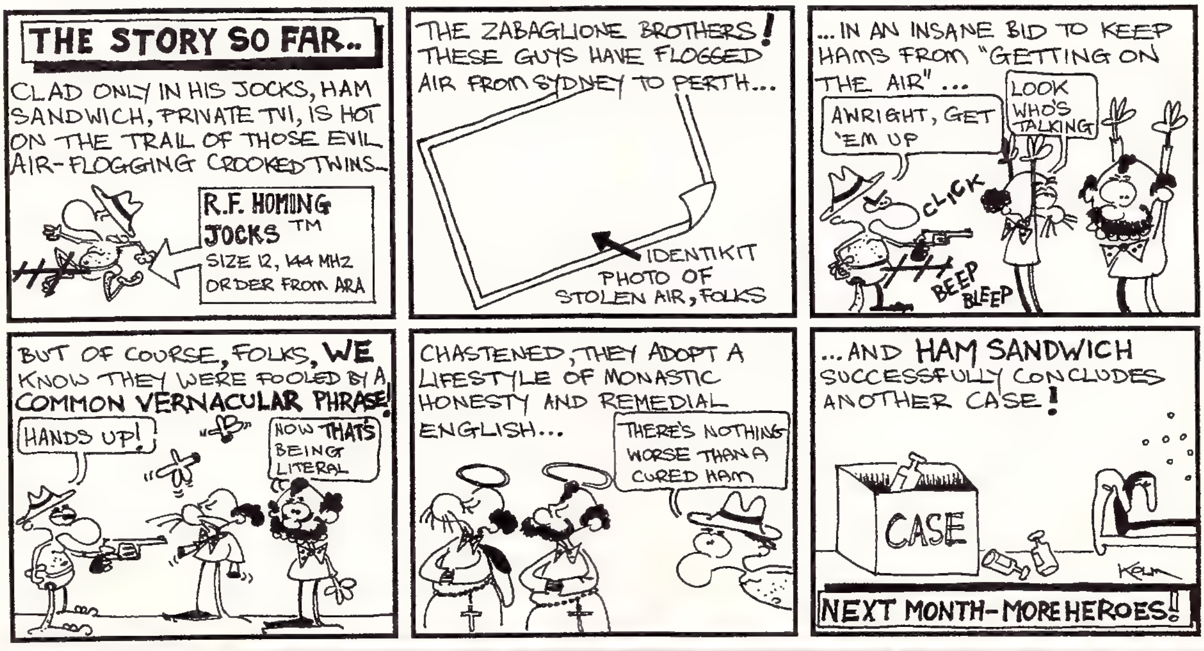
So you can see that NOS is, in fact, a set of protocols which allow a whole series of functions to be accomplished automatically and with the minimum of fuss. The computer is still available for other duties, courtesy of DesqView, and the problems of channel congestion are avoided by leaving the machine to it, or by arranging for the software to run in the middle of the night when things are quiet.

I have only touched on the power of this kind of packet networking, to give a taste of how the software works. There is much more to TCP/IP than this and as I learn more, I will pass it on through the **Science Page**. There are other networking protocols, too, which readers might be prepared to tell me about if they have time. All messages to VK3DBP @ VK3BLW will get replies, as will those sent more conventionally via other means.

See you next time.

73s from Paul, VK3DBP.

HEROES OF HAM RADIO #86. HAM SANDWICH V.


THE STORY SO FAR..
CLAD ONLY IN HIS JOCKS, HAM SANDWICH, PRIVATE TVI, IS HOT ON THE TRAIL OF THOSE EVIL AIR-FLOGGING CROOKED TWINS...
R.F. HOMING JOCKS TM SIZE 12, 144 MHz ORDER FROM ARA
THE ZABAGLIONE BROTHERS! THESE GUYS HAVE FLOGGED AIR FROM SYDNEY TO PERTH...
IDENTIKIT PHOTO OF STOLEN AIR, FOLKS
...IN AN INSANE BID TO KEEP HAMS FROM "GETTING ON THE AIR"...
AWRIGHT, GET 'EM UP
LOOK WHO'S TALKING
CLICK
BEEP BLEEP
BUT OF COURSE, FOLKS, WE KNOW THEY WERE FOOLED BY A COMMON VERNACULAR PHRASE!
HANDS UP!
NOW THAT'S BEING LITERAL
CHASTENED, THEY ADOPT A LIFESTYLE OF MONASTIC HONESTY AND REMEDIAL ENGLISH...
THERE'S NOTHING WORSE THAN A CURED HAM
...AND HAM SANDWICH SUCCESSFULLY CONCLUDES ANOTHER CASE!
CASE
KEN
NEXT MONTH-MORE HEROES!

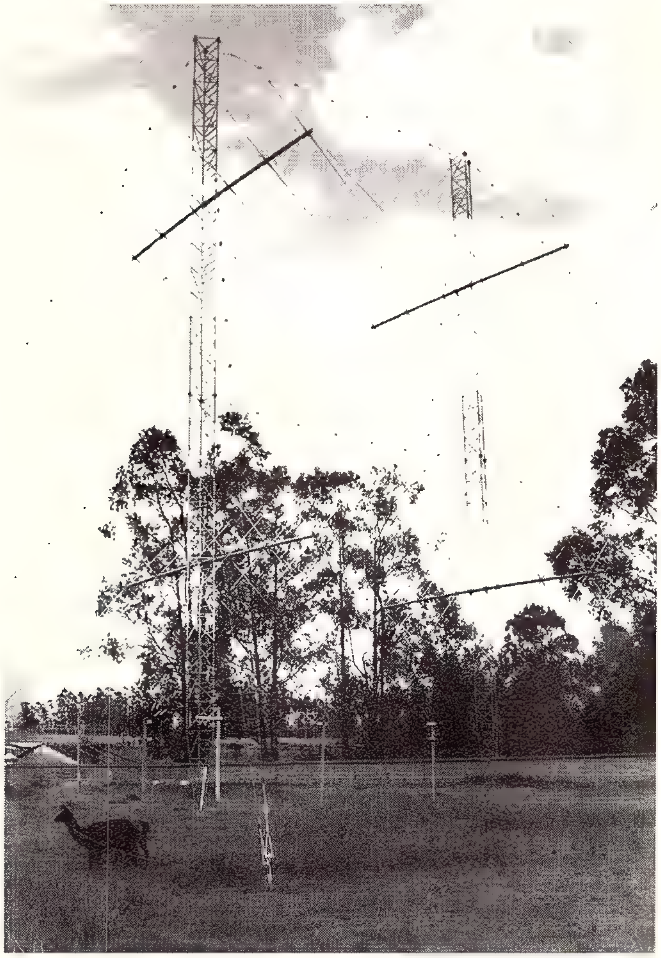
BIG ANTENNAS...

HCJB to fire up on 20, 15 & 10!

Christians to feed amateur receiver front-ends to lions...

From Friday, December 6 1993 at 2100z until Sunday, December 8 1993 at 0300z you'd better make sure you have an attenuator close at hand when venturing onto the amateur HF bands.

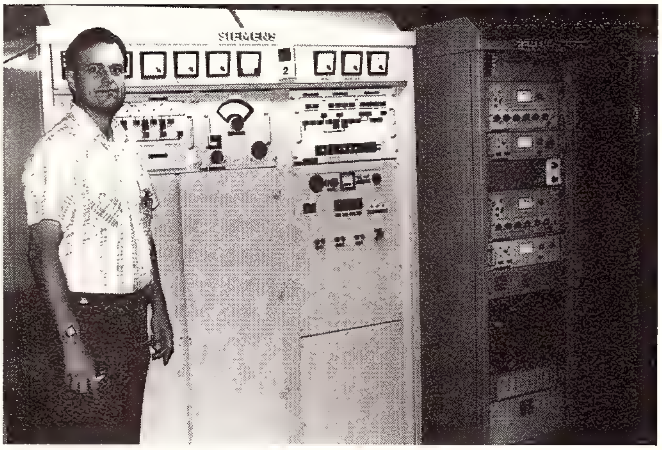
You see, radio station **HCJB** (better known to brethren of the ethereal flock as **Heralding Christ Jesus' Blessings**), on-air since Christmas Day, 1931, is to don the frock of **HC6ØJB** and dispense signal reports and rare special-event QSL cards (and last rites to our crystal set) in commemoration of its 60th anniversary on the air.



The Almighty's word will need to be tempered though, as HCJB's available SSB output of 30,000 watts (from the smallest of a vast array of transmitters on site) firing into umpteen dBs of gain antennas is just slightly over the maximum allowable (amateur) 1.5 kW in Pifo, near Quito, Ecuador.

Providence being what it is, HCJB will be winding the wick back to the allowable limit — then feeding the repressed signal into a 'small' aerial array (small in comparison to Mt Everest, that is) which will help the word get out. They will 'raise the curtain' on a 30-storey-high *steerable* array gifted with no less than 25 dBi gain (now *that* antenna would move in mysterious ways!).

ARA's brute force dictionary defines a gain of 25 dBi on HF as 'Divine and BIG Intervention'. Our calculator makes it an ERP (Ethereal Religious Presentation or Extremely Rude Power?) of 7,680,000 watts, give or take one or two! Okay, I reckon we'll be able to just about hear them with that. In fact, I might hook a few light globes up to my HF beam to save the power bill. But I have to wonder if they'd be able to hear a reply?

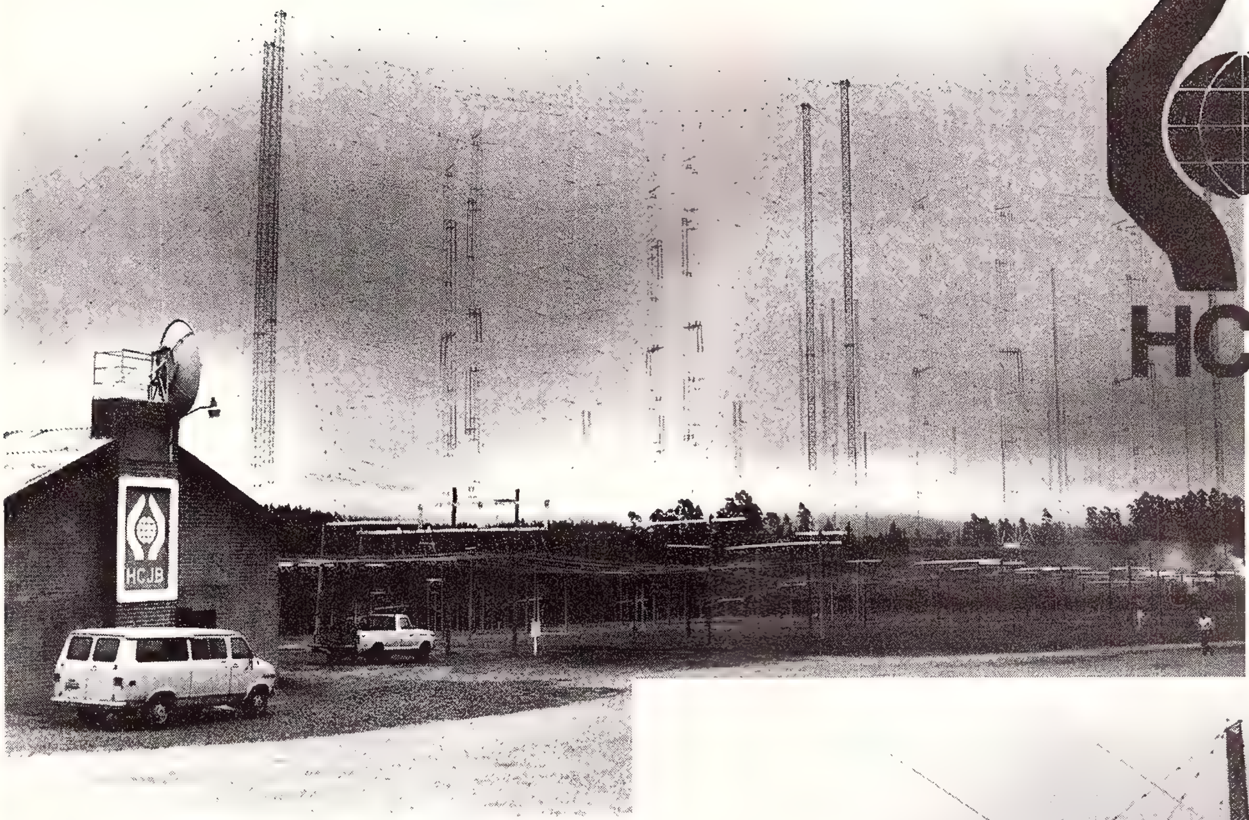


Well, they're also planning for that: according to **Keith Clukey, KC6SMW/HC1** (pictured above), an HCJB machinist and amateur operator coordinating the event, "We plan to have two amateurs working simultaneously on two different bands, depending on conditions. They will receive contacts [direct off air] in their homes in Quito and use the telephone to tap into HCJB's microwave system. The signal will then be beamed the 18 miles to Pifo for broadcast around the world via our Siemens SSB transmitters.

"The reason for this elaborate system is that we can't actually *receive* other stations in Pifo due to interference from all the transmissions there. We have 12 high-power transmitters operating at different times and frequencies.

"The Siemens transmitters, which first went on the air in the summer of 1990, are capable of putting out 30kW all day, but for the purposes of the exercise they will be detuned to amateur limits... However, our antennas will boost the signal strength considerably!" (Can't you just hear the laugh as he added those final words? We all have our crosses to bear, Keith! Ed.)

This special event is only the second of its kind to be held in HCJB's 60 year history, the first being during 1983's World Radio Communication Year. This time around there will be more than 18 amateur operators at the facility — we hope that they won't all be speaking at once, though it *is*



known that they will be speaking in tongues — 22 of them, to be precise.

Although HCJB's primary purpose is to spread the gospel of Jesus Christ, even non-Christians are attracted to the station's unusual programming. "We're a religious broadcaster, but we have a lot of DX programs as well as news and cultural information of general interest to all our listeners."

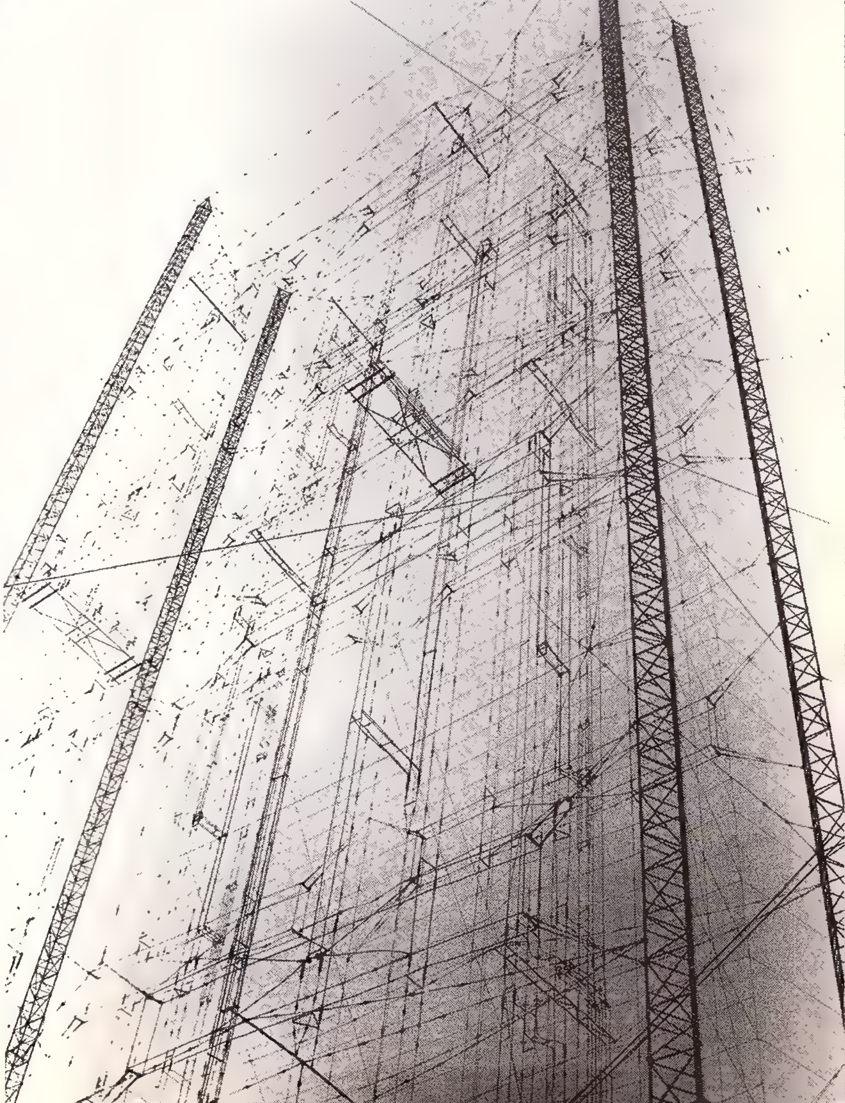
For those of you who may be interested, HCJB is operated by **World Radio Missionary Fellowship**, an evangelical, inter-denominational organisation involved primarily in broadcasting. The mission also operates two hospitals in Ecuador and helps serve the rural areas through community development and mobile medical clinics (not to mention catering to the special needs of QSL card collectors).

In addition, HCJB is involved in producing television programs (how about fast-scan UHF TV DX, guys? Run enough wick and you're *sure* to get through!) and training Ecuadorians for leadership positions in medicine, radio, TV, evangelism, and music. The mission has offices in more than 20 countries with local radio ministries in Texas, Panama, Ecuador, Argentina, and Europe.

It sounds as though Christ Jesus' blessings are set to multiply in a phase-locked-loop near YOU! Listen out for **HC60JB** on **14,225**, **21,300** and **28,500** kHz during December.

To obtain your QSL card, send a reception report to:

HC60JB,
HCJB,
Casilla 17-01-00691,
Quito,
Ecuador.



DX & BAND REPORT

I'm setting out tomorrow, as I write, for my stateside visit which will take in the big DX bash in Texas, so I've made a very early start to the DX and Band column. Kirsti updated it just before it was sent to the editorial offices.

In a very recent fax it was brought to my attention that a US firm has won a major contract in relation to undersea acoustics. You may recall that Heard Island was in the news and in this column some time ago because near Heard was a unique point which was used to launch an acoustic wave front. *(We presented Jim's account of these experiments in the last issue. Ed.)* The purpose was an experiment to determine whether global warming could be measured in this way. Since then I have seen no data which indicated whether the experiment proved, or otherwise, that it had been a valid source of information.

Anyway, judging by this contract it would seem that during a period of some 30 months or so more oceanographic acoustic shots will be fired. Two other locations are given, one near Hawaii and the other off the Californian coast. It is exciting to think that the feasibility study initiated off Heard Island has apparently been successful and may lead to more definitive results in due course.

As I write this a planned DXpedition to the newly-independent country of Eritrea has made a start. I received a telephone call a few minutes ago to say that the group had arrived safely in Asmara. They expected to start activity in a few hours time. What makes this DXpedition special is that it is also addressing the problem of starting the amateur radio service in that country.

It is this outlook which has to be strengthened and developed throughout the world. These countries need assistance, and it is rewarding when this path is chosen instead of the usual 'DXer' outlook. We are not doing ourselves any justice if we do not stop to consider exactly what is entailed in getting amateur radio started in these third-world countries. Apart from a lead-in seminar on the amateur radio service there are plans to train operators, set up the infrastructure for licensing and so on. Let us wish this project every success and extend our hand of welcome to the future radio amateurs of the country known as Eritrea.

VR8A/B — a mystery

I wonder how many amateurs have bumped into either VR8A or V**R8B** and whether they can shed any light on the activities of either station. The VR8A business has been going on for quite a few years. A few years ago the operator was giving my call as the QSL manager and as I recall receiving quite a few QSL cards.

The other evening **Bill**, **VK4CRR** gave me a telephone call and told me that VR8B was on 7 MHz CW — did I know anything about it? Well, I had to say that I knew nothing but I headed down to 7 MHz CW anyway. Sure enough, there was a pile-up and **Yvonne**, signing **VR8B** was having a ball. Lavish use of 88s and plenty of 'skirting' around simple questions like QSL information and the like, but *plenty* of Yvonne and 88s!

However when 'she' finally gave her QTH as Ducie Island (see last issue column) I became very interested. Since I have a *very* accurate switchable 40 metre beam I knew almost immediately that the station was *nowhere* near Pitcairn Island. In fact, such was the signal strength that I placed the station as being somewhere between down the bottom of my garden and all points en route to New Zealand!

On listening further, other strange characteristics came to mind — it was very good CW being sent at a modest speed on a straight key. There was also the use of strange abbreviations which I have not heard for many years. For example **ere** instead of the usual **hr** and **OC** instead of the more usual **OM**. Both these terms and a couple of others were, at one time, widely used by service operators. Do we then have someone in the region, getting on in years and having a bit of fun or do we have a maritime source plying the region, again with the operator livening up a boring watch?

If you have anything else to add to this story please drop me a line; it would be appreciated. Perhaps we can get this operator interested in sitting for a ticket, for the CW is certainly of a very high — dare I say 'professional' — standard. Finally the use of Ducie Island as a supposed location was intriguing. Had they listened to **Brian**, **VR6BX** or had they just read the local paper where I had written a short article on Brian and Ducie Island?

Very strange. Get your thinking caps on out there.

After a short QSO with me 'she' declined to move to SSB, to discuss Ducie Island or to give QSL information or to say which country had issued the VR8 callsign. 'She' then went QRT...

Bhutan A5

I spoke to Bhutan's Minister of Communications a couple of day ago and can report no further progress at this time. The legislation for the introduction of the amateur radio service is still being discussed.

This is mentioned since there have been reports of A5 activity usually giving a JA QSL manager who is not listed in any callbook.

Spratly Islands 1S

The operation from the Spratly Islands (Malaysian area) started up the other day signing 9M0S and I was able to work **Martti Laine**, **OH2BH** on SSB and **Wayne**, **N7NG** on CW fairly easily. However I have not heard them with strong signals, and at the time of writing I am not sure how things are going in terms of number of QSOs or other details. According to a last-minute release the following operators were scheduled to take part: OH**1NYP**, **OH2BH**, **OH2MAK**, **N7NG**, **AB6NJ**, **WA6AUE**, **JA5DQH**, **9V1YW**, **9M2FK** and **9M6TC**. Quite a team and, with a reliable QSL source, this one will be easy to confirm. Don't forget to give a bit of help, if you can, when you send your QSL card.

I understand that the delay was in part due to the extreme sensitivity of the area and required high-level clearance before the DXpedition could go ahead.

QSL Route: W4FRU

Compiled by Jim Smith, VK9NS
PO Box 90, Norfolk Island, South Pacific 2899

Dodecanese Islands SV5

There has been quite a bit of activity from Rhodes by **SV5/K5BDX**. Don was in place for the CQ WPX contest and he was very good copy here on CW.

QSL Route: NA5U

Also reported was **SV5/SM7DAY** who works QRP CW.

QSL Route: SM7DAY direct or via the bureau.

Ghana 9G1

Following fast on the heels of the recent PA DXpedition to Ghana signing 9G1**AA**, there are several reports of activity from Ghana, which is good news indeed.

Sewell, 9G1SB has been reported active on 21 MHz SSB at around 1500z. That's not the best time for us over in this part of the world...

Marion Island ZS8

I always get a strange feeling when I hear that ZS**8MI** is active as, on occasions, it has long periods of amateur radio silence. This is one of the countries one has to work and its availability depends on so many factors. The callsign ZS8MI is special to all DXers, since it will be this station that will be worked for Marion Island DXCC credit.

ZS8MI was reported on the ANZA net the other day and I will give more details next column. I'll need a bit of time to check whether it is genuine or not and get the QSL information etc.

MV Island 4J1

There have been many reports of difficulties with the 4J1FS QSL card for the MV operation last year, in May to June 1992. Apparently there was a problem with O**H2BU** but this has now been cleared up. OH2BU now reports that all cards received have been processed. Stay tuned.

Bangladesh S2

With the recent activity by a JA group from Bangladesh in April and May this year, the callsigns used were: S21Z**N**, **S21ZO**, **S21ZP**, **S21ZR**, **S21ZS**, **S21ZT**, **S21ZU** and **S21ZV**. All these stations were members of the U**NICEF Ham Club** and they have a common QSL manager, who is **Kauyoshi Kimura**, **JA3ULS**, PO Box 58, Moriguchi, Osaka 570, Japan.

Nauru C21

Very fast QSL card from At**su**, **VK2BEX** for his recent operation from Nauru signing **C21/VK2BEX**.

St Pierre & Miquelon FP

It is reported that N**M7N**, **N4DDK**, **VE7YL** and **XE1CI** are planning a DXpedition to this rarish spot. What makes the idea that bit special is that all the operators listed are YLs. They plan CW, SSB and RTTY activity during the 7-day operation scheduled for the end of June. I have no QSL information at the moment.

Faroe Islands OY

If you worked OY/G4X**RV** or **OY/DK9FE** on CW recently they ask for QSLs to their respective home callsigns.

Penguin Island ZS1

Good news for those who missed this one in the past. It is reported that DJ**0WQ**, **DJ2SS** and **DJ4LK** are planning a DXpedition to Penguin Island in late July/early August. Operation is planned on all bands CW, SSB and RTTY. No details about QSLing at this time.

Saudi Arabia HZ

Those who worked Bir**gitta**, operating **HZ1TA**, during May should QSL to her home callsign.

QSL Route: **SM0FIB**

Yemen 4W

In a recent report it is stated that Yemen was asked, by the ITU, to relinquish one of its allocated prefixes, either 7O or **4W**. Yemen apparently elected to retain the 4W prefix and has released 7O to the ITU for further use. See previous notes on the planned DXpedition to Yemen later this year. I'm sure it will be interesting to see what callsign is finally used.

Special call

XO7G was very active the other day on 20 metres and this special call was being used to mark the *1993 Friendship Sport Games* being held in Victoria, British Columbia during June.

QSL Route:
FARS-Victoria, c/o Camosun College,
PO Box 128, 3100 Foul Bay Road, Victoria, British Columbia V8P 5J2 Canada

Burkino Faso XT

As Pe**ter**, **XT2BW**, heads for the end of his assignment he has been very active and several stations have reported that he has been on RTTY several times in recent weeks. If you still do not have XT in your log it is worth looking for Peter. It is hard to say whether there will be further amateur radio activity when he leaves the country in a few months time.

Thursday Island VK4

Congratulations to Rex **VK4BRE** on his recent upgrade to full call status. There was a mild hiccup as he understood that his new call was VK4**V**RE! This was what was heard over the telephone. Viva la phonetics as V and B sound very similar. Rex now has his license in hand and the call is definitely VK4BRE!

Note also that his XYL, Do**t**, is also licensed as **VK4MME** and is the first indigenous islander to earn an amateur radio ticket. So our congratulations are also due to her — well done!

Albania ZA

QSL cards for the recent CQWW 1992 operation by ZA1**A** should go to one of the following routes:

QSL Route:
Via **HB9BGN**
or
PO Box 66,
Tirana,
Albania

IOTA Convention

It is reported that the IOTA convention held in May was a great success. Many of the well-known DXpeditioners and those who have administered the IOTA program were present.

A couple of special callsigns were allocated for the event and both **AN7IOT** and **EH7IOTA** were worked here on Norfolk Island.

The convention also received a special message from **King Juan Carlos** of Spain for the opening ceremony.

QSL Route: **EA5OL**

Hervey Bay

I received a letter from the **Hervey Bay Amateur Radio Club** where they advise that they will *not* be activating any special award during the annual Hervey Bay Whale Festival. Instead

"THE OUTBACKER"

- ALL BANDS IN ONE NEAT ANTENNA
- CONVENIENT MOBILING
- RUGGED CONSTRUCTION
- COMPLETELY WEATHERPROOF
- SAME COMMERCIAL DESIGN PROVEN
- IN THE OUTBACK FOR 15 YEARS.

The antenna is constructed of fibreglass with copper helical windings. The exterior is covered with a coating of epoxy and urethane for added strength, durability and protection. Tap points or frequencies are clearly engraved for each band. Sockets are made from brass, nickel-plated.

The wander lead is used for quick, easy, manual band changing - just plug one end into the lowest socket, wind the remainder clockwise around the antenna and plug the other end into the required frequency.

The optional mounting base and spring is made of solid brass, nickel-plated, and the spring is zinc-plates spring steel.

An SO-239 is mounted on the side for feed termination. At the bottom of the base a threaded 1/2" hole is used for mounting to the vehicle via a suitable adaptor (not supplied).

All Outbacker antennas are capable of handling 300 Watts PEP.

Outbacker Code:

A. 80 - 40 - 30 - 20 - 17 - 15 - 12 - 10	$300.00
B. 80 - 40 - 20 - 15 - 11 - 10	$273.00
C. 80 - 40 - 20 - 15 - 10	$255.00

Extra Frequencies commercial - RFDS etc	$27.00
2-piece Split Model available with all codes except codes "A" ... an extra	$40.00
Mounting base and spring to suit all above antenna ... Complete	$98.00
AIR delivery door to door anywhere in Australia	$12.00

Now available from Andrews Communications Systems ANTENNA MANUFACTURE AND SALES

TERLIN AERIALS

3 YAMPI WAY,
WILLETTON, WA 6155
(09) 457 6238
(09) 457 3807

they will be calling CQ CQ on a 24-hour basis for the first seven days of August 1993, hoping to exchange cards with operators in as many different countries as possible.

The frequencies used will be as close to these as possible: 3.794; 7.100; 14.235; 21.250; 28.495 MHz, all plus or minus QRM of course.

Also, Australian novice frequencies will be used as much as possible, bands permitting.

The letter goes on to say: "For the information of any operators who made contact with either VI4**HBW** in 1991 or **VI4FOW** in 1992, which were two entirely different awards, there are still limited supplies of both available.

The normal five green stamps secures either of these rather magnificent enlarged photographs of hump back whales at play.

"Also, some members of our club recently activated **Fraser Island**, OC 142. We made 4500 contacts in eight days.

"We still have quite a lot of these specially-printed cards left, so any island chasers who made contact with us are still able to obtain their verification QSL card for the price of return postage.

"Applications for any of these awards and/or QSL cards may be sent to:

The QSL Manager,
HBARC Inc,
PO Box 829,
Hervey Bay,
Queensland 4655,
Australia."

Needed country list

It is t*hat* time again, and **Bill, VK4CRR** would appreciate hearing from all you DXers out there. What countries do you need and, if you are a CW/SSB operator, *two* lists would be great — one for each mode.

Bill did a good job on the last list, although many did not bother to send their needs.

Let's try a bit harder this time around. This is a list for the DXers in this part of the world and the more input the more accurate the final list becomes.

Do it now!!!!!!

Send your list to Bill, VK4CRR, and he'll do the rest.

So that is about it for the moment. The new 12-element log periodic is (*finally! See YL Forum. Ed.)* in the air and seems to work.

The difference on the 18 and 24 MHz WARC bands is outstanding, signals received far outstripping those form any other antenna which I have and have used on 18 and 24 MHz.

My general band activity has been mainly chasing islands in the IOTA program and it takes time to get everything in place so that one knows what is around.

It is very similar to DXCC. If you don't know what is happening, or what is about to happen, it is difficult to get ahead.

So in this way IOTA also suits my outlook on DXing, and island hunting will be a further interest for me now that I've got the DXCC licked on both voice modes and on CW.

The IOTA group interested in this area of amateur radio is also very helpful and very similar to the DXCC gang.

I hope to be active from the USA and will try to get my **WR1Z** callsign on the air from time to time during my travels.

Thanks is due to the many who keep me informed on the personal front, and a special thanks is due to the following DX outlets which also keep me informed:

QRZ DX,
Les Bacores DX,
Long Island DX Bulletin,
JA-59 Magazine,
JA-DX News,
RSGB DX Newsletter,
DXpress,
W6GO/K6HHD Managers List,
Lynx DX Bulletin,
Les Bacores DX,
Long Skip, and more.

Stop Press: The group organised by *Ham Forum* — **LA5X** — opened up from Eritrea as promised, using the call **E35X**.

QSL route:
Ruth Tollefsen, LA6ZH,
PO Box 17,
N-0617 Oslo,
Norway.

73 from Jim, VK9NS

Hey! If you aren't wearing an ARA T-shirt or sweatshirt, how will anyone know who you are?!

Get the amateur look' with an **Amateur Radio Action** short-sleeve T-shirt or winter-weight long sleeve sweatshirt. Just fill in this *express order form*, and let the world know who you are... They cost just $15 for each T-shirt or $25 for each sweatshirt — or get one of each for an even-better $38! Please indicate your choice of size below.

radio
QRZ?
radio
QRZ?

Please indicate your choice of size: **Extra small** (sweatshirt only) / **Small** / **Medium** / **Large** / **Extra large**.

Name: ____________________

Postal address: ____________________

____________________ State ____________ Post Code ________

☑ Yes! Please send me a great **Amateur Radio Action** ☐ T-shirt ☐ Sweat shirt. I enclose my cheque / money order for $ _____ *or* debit my Mastercard / Visa / Bankcard for $ _______

Card number ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date ___/___ Signature ____________________

Rush your order to **ARA Shirt Offer, GPO Box 628E, Melbourne, Victoria 3001**

Propagation

East - England (short path)

```
28.5
24.9
21.2       ......         ..
18.1 .  ..%%%F%........   .%..
14.2 %%A     AAAAA%%%.%...%F%%
10.1                   %%%FF
 7.2                    FFF
 3.6                    FFF
 1.8                    FFF
 0.9                    FFF
 MHZ
 UT 00    06    12    18    24
```

East - England (long path)

```
28.5
24.9                       .
21.2 ..     .             .%..
18.1 %%.....%..           %F%%
14.2 FF%%%%%F%%.A         FFFF
10.1      FF               A
 7.2
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

ABOUT THESE CHARTS

The data on these pages are graphs showing forecasts for expected HF operating conditions between Australia and a number of important DX destinations. The information they contain is prepared by **IPS Radio and Space Services**, a division of the federal Department of Administrative Services. IPS monitors changing radio conditions — which are affected most greatly by fairly-predictable changes in solar activity — and issues reports and warnings based on that data.

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East - central and east coast USA

```
28.5
24.9 ...                     .
21.2 %%%..               ....%
18.1 %%%%%..     ......  %F%%%
14.2 AAFFF%%%%..%%%%%A       A
10.1       FFFFFFF
 7.2       FFFFFF
 3.6        FFFFF
 1.8        FFFFF
 0.9        FFFFF
 MHZ
 UT 00    06    12    18    24
```

East - west coast USA

```
28.5 .....                  ..
24.9 ...%...  .           ....
21.2 %%%%%%%....  .      .%%%%
18.1 SSSSS%%%%%%.......  %SSSS
14.2  ASSSSSSSMM%%M%%%%A
10.1       SSSMMSSMSS
 7.2        SSMMSSMS
 3.6        SSMMSSMS
 1.8        SSMMSSMS
 0.9        SSMMSSMS
 MHZ
 UT 00    06    12    18    24
```

East - South America

```
28.5 .                       .
24.9 ....                  .%.
21.2 %%....                %F%
18.1 F%%%%.....           %FFF
14.2 FFFFF%%%%%. ....     FFFF
10.1      FFFFF%%F         A
 7.2       FFFFFF
 3.6       FFFFFF
 1.8       FFFFFF
 0.9       FFFFFF
 MHZ
 UT 00    06    12    18    24
```

East - West Indies

```
28.5 ...                   ...
24.9 %%%....              .%%%
21.2 F%%%%....            %FFF
18.1 FFF%%%%%...         %FFFF
14.2 FFFFFFFF%%%.....A    AAFF
10.1      FFFFFFFF
 7.2       FFFFFF
 3.6       FFFFFF
 1.8       FFFFFF
 0.9       FFFFFF
 MHZ
 UT 00    06    12    18    24
```

East - Japan

```
28.5     %%%. .
24.9   ..%%%....             .
21.2 ...%MMM%.%......     .%%.
18.1 SSSSMMMS%%%%....     %%%S
14.2 SSSSSMMSSMMMMM%%.....SSSS
10.1         AMMMMMMM%%MM%S
 7.2          MMMMMMMSSMMS
 3.6          MMMMMMMSSMM
 1.8          MMMMMMMSSMM
 0.9          MMMMMMMSSMM
 MHZ
 UT 00    06    12    18    24
```

East - central Europe

```
28.5
24.9
21.2     ........
18.1   ..%%%FF%.........  ...
14.2 %%A      AAAA%%%.%...%%%%
10.1                  F%%%FF
 7.2                   FFFF
 3.6                   FFFF
 1.8                   FFFF
 0.9                   FFFF
 MHZ
 UT 00    06    12    18    24
```

East - Middle East

```
28.5    .....
24.9   ....%%.
21.2 ..%%%%%F%..           ...
18.1 .%%FFFFFF%.....   .   ...
14.2 FFFA      A%%%%...%..%FFF
10.1               FFFFFFFFF
 7.2                FFFFFFF
 3.6                FFFFFFF
 1.8                FFFFFFF
 0.9                FFFFFFF
 MHZ
 UT 00    06    12    18    24
```

East - North Africa

```
28.5
24.9      ....
21.2 ... .%%%%..           ...
18.1 %....%%%F%....    ..  %%%
14.2 F%%%A        A....%%..FFF
10.1                  FFFFFF
 7.2                   FFFFA
 3.6                   FFFF
 1.8                   FFFF
 0.9                   FFFF
 MHZ
 UT 00    06    12    18    24
```

East - West Africa (short path)

```
28.5
24.9 .                       .
21.2 %..    ..              .%
18.1 %%..   %%..            %%
14.2 FF%%...FFF%A          %FF
10.1       FF          %%%%FF
 7.2                   FFFFF
 3.6                    FFFF
 1.8                    FFFF
 0.9                    FFFF
 MHZ
 UT 00    06    12    18    24
```

East - West Africa (long path)

```
28.5                      .
24.9         .            .
21.2        ....         .%.
18.1 .......%%.........  %%%..
14.2   AA..%FF%%A     AAAA
10.1       FF
 7.2
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

East - South Africa

```
28.5        .
24.9       .%.
21.2      .%MF..
18.1      %SMM%..
14.2     %SSMMMM%%...
10.1              MMMMMMMM%..
 7.2               MMMMMMMMM
 3.6               MMMMMMMMM
 1.8               MMMMMMMMM
 0.9               MMMMMMMMM
 MHZ
 UT 00    06    12    18    24
```

forecaster July 1993

LEGEND TO SYMBOLS

- • Propagation is possible, but unlikely at this time and frequency on more than half the days of the month.
- % This frequency/time pair should allow communications on between 50% and 90% of the days of the month.
- F Your best bet: first 'F' mode conditions should apply on at least 90% of days this month for the given time and frequency.
- E Propagation via the 'E layer' expected on up to 90% of days of the month at this time and frequency.
- P A fair mixture: up to 90% chance of a path using 'F mode' and between 50% and 90% probability of an 'E layer' path.
- B A good mixture: up to 90% chance of a path using either 'E layer' or mixed 'F' modes.
- M A mixture of combined 'F' modes — both first and second mode up to 90% of the time.
- S Second 'F' mode conditions should apply on at least 90% of days this month for the given time and frequency.
- A High atmospheric absorption of the signal is likely — better to use a higher band. Too close to the ALF for good HF signals.
- X A complex mixture of modes is likely to apply and could possibly include the second 'E' mode.

West - England (short path)

```
28.5
24.9         ..
21.2      ....%%..
18.1 .. ..%%%FFF%.....       .
14.2 %%%%A       AA%%%.......%
10.1 F                A%%%%%FF
 7.2                    FFFFF
 3.6                    FFFFF
 1.8                    FFFFF
 0.9                    FFFFF
 MHZ
 UT 00    06    12    18    24
```

West - England (long path)

```
28.5
24.9
21.2 .       ...             .
18.1 %..   ..%%..           .%
14.2 FF%%%%%%FF%AA          FF
10.1        A
 7.2
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

West - central and east coast USA

```
28.5
24.9
21.2 ..%.                   ..
18.1 %%%%..      .....     .%%
14.2     A%%.....%%%%A
10.1         AFFFA
 7.2          FFA
 3.6          FF
 1.8          FF
 0.9          FF
 MHZ
 UT 00    06    12    18    24
```

West - west coast USA

```
28.5
24.9 .......                ..
21.2 %%%%%%%..              %%
18.1 F%%%%%%%%.....        .FF
14.2    AFFFFF%%%%%.....A
10.1         FFFFFFFF
 7.2          FFFFFF
 3.6          FFFFFF
 1.8          FFFFFF
 0.9          FFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - South America

```
28.5
24.9  ..
21.2  ...
18.1 .%%%.....               .
14.2 %FFF%%%%%. %..          %
10.1 FF      FF%FF        ..%F
 7.2 F        FFF          FFF
 3.6          FFF          FF
 1.8          FFF          FF
 0.9          FFF          FF
 MHZ
 UT 00    06    12    18    24
```

West - West Indies

```
28.5  ..
24.9 .%.....                 .
21.2 %%%%%%%....             %
18.1 FFF%%%%%%...           .F
14.2 FFFFFFFF%%%%..         FF
10.1        AFFFFF
 7.2         FFFF
 3.6          FFF
 1.8          FFF
 0.9          FFF
 MHZ
 UT 00    06    12    18    24
```

West - Japan

```
28.5      .....
24.9   ....%....
21.2 ...%%%%%%%..           ..
18.1 SSSSSSSSS%....         %S
14.2 SSSSSSSSSSS%%.......  .SS
10.1          SSSSSSS%%%%%
 7.2           SSSSSSSSSSS
 3.6           SSSSSSSSSSS
 1.8           SSSSSSSSSSS
 0.9           SSSSSSSSSSS
 MHZ
 UT 00    06    12    18    24
```

West - central Europe

```
28.5
24.9         ..
21.2     ....%%%%.
18.1 ....%%%FFFF%......      .
14.2 %%%FA      AA%%%%.......%
10.1 F                FF%%%%FF
 7.2                   FFFFFF
 3.6                   FFFFFF
 1.8                   FFFFFF
 0.9                   FFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - Middle East

```
28.5    .........
24.9   .%%%%%%%%..
21.2 ..%MMMMMMMM%..          .
18.1 .%MMMMMMMMMM%.....      .
14.2 MMMMMSSSSSMMM%%%%%......M
10.1 MA           AMMMMMMMMMMM
 7.2                MMMMMMMMM
 3.6                MMMMMMMMM
 1.8                MMMMMMMMM
 0.9                MMMMMMMMM
 MHZ
 UT 00    06    12    18    24
```

West - North Africa

```
28.5
24.9      .......
21.2  ....%%%%%%%.
18.1 %....%%%FFFF..          %
14.2 FFF%FAA      A..........F
10.1 F                FF%%%%FF
 7.2 F                 FFFFFFF
 3.6                   FFFFFF
 1.8                   FFFFFF
 0.9                   FFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - West Africa (short path)

```
28.5         ...
24.9        .%%%.
21.2  ..    %FFF.
18.1  %..  .FFFF%.
14.2 %F%%..%FFFA   A..   ... %
10.1 FF                %%%%%%F
 7.2 F                 FFFFFFF
 3.6 F                 FFFFFFF
 1.8 F                 FFFFFFF
 0.9 F                 FFFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - West Africa (long path)

```
28.5
24.9         ..
21.2        .%%.
18.1 ........F%%...        ...
14.2   AA...%FFFA
10.1         A
 7.2
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

West - South Africa

```
28.5       ....
24.9       %%%%.
21.2      %MMMM%.
18.1      FMMMMM%.
14.2     %MMMMMMM%..
10.1 ..  AAAAA  ASMM%%%%%%....
 7.2 M             AMMMMMMMMMM
 3.6 M              MMMMMMMMMM
 1.8 M              MMMMMMMMMM
 0.9 M              MMMMMMMMMM
 MHZ
 UT 00    06    12    18    24
```

Propagation

East - England (short path)

```
28.5
24.9          ..
21.2      ...%%......     .
18.1     .%%%%%%........  ..
14.2 .A     AAAFA%%%%%%...%%%.
10.1                  F%%%F
 7.2                   FFFF
 3.6           .        FF
 1.8                    FF
 0.9                    FF
 MHZ
 UT 00    06    12    18    24
```

East - England (long path)

```
28.5
24.9                       .
21.2        ..            .%.
18.1 ..    .%%..          %%%.
14.2 %%%%..%FF%%AA       %FFF%
10.1      AFF
 7.2       F
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

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East - central and east coast USA

```
28.5
24.9 ...                 .....
21.2 %%%.                %%%%%
18.1 FF%%..      ......  FFFFF
14.2  AFF%%%%....%%%%A
10.1       FFFFFFF
 7.2        FFFFF
 3.6        FFFFF
 1.8        FFFFF
 0.9        FFFFF
 MHZ
 UT 00    06    12    18    24
```

East - west coast USA

```
28.5 .....                ....
24.9 %%%%%.              .%%.%
21.2 %%SS%%........     .%%%%%
18.1 SSSSS%%%%%%%%.......SSSSS
14.2   ASSSSSMMMMMM%%%%.A
10.1       SSMMMMMMSS
 7.2        SMMMMMMS
 3.6        SMMMMMMS
 1.8        SMMMMMMS
 0.9        SMMMMMMS
 MHZ
 UT 00    06    12    18    24
```

East - South America

```
28.5 ....                    .
24.9 %......               ..%
21.2 %%%%%%...            .%F%
18.1 FFF%%%%%.            %FFF
14.2 FFFFFFFF%.......    %FFFF
10.1      AFFFF%FF
 7.2       FFFFFF
 3.6        FFFFF
 1.8        FFFFF
 0.9        FFFFF
 MHZ
 UT 00    06    12    18    24
```

East - West Indies

```
28.5 ...                   ...
24.9 %%%...               .%%%
21.2 FF%%%.....          .FFFF
18.1 FFF%%%%%%.....      FFFFF
14.2 FFFFFFFFF%%%%%.A      AAF
10.1       FFFFFFF
 7.2       FFFFFF
 3.6        FFFFF
 1.8        FFFFF
 0.9        FFFFF
 MHZ
 UT 00    06    12    18    24
```

East - Japan

```
28.5   .%%%%....
24.9 ...MMM%.%......      ....
21.2 %%%MMMM%M%%....      .%%%
18.1 SSSMMMMSMM%%%%%...  .%SSS
14.2 SSSSSMMSMMMMMMM%%%..%SSSS
10.1         MMMMMMMSSMMMMS
 7.2          MMMMMMSSMMMM
 3.6          MMMMMMSSMMMM
 1.8          MMMMMMSSMMMM
 0.9          MMMMMMSSMMMM
 MHZ
 UT 00    06    12    18    24
```

East - central Europe

```
28.5
24.9        ....
21.2     ...%%%.....
18.1    .%%%%F%%........  .
14.2 ..A     AAA%%%%%%%...%%..
10.1                 FFF%%FA
 7.2                  FFFFF
 3.6                  FFFFF
 1.8                  FFFFF
 0.9                  FFFFF
 MHZ
 UT 00    06    12    18    24
```

East - Middle East

```
28.5    ......
24.9   .%%%%%%.
21.2  .%%%%%FF%..          .
18.1 ..FFFFFFFF%........  ....
14.2 %FAA      A%%%%%%%%..%%%%
10.1               FFFFFFFFF
 7.2               FFFFFFFF
 3.6                FFFFFFF
 1.8                FFFFFFF
 0.9                FFFFFFF
 MHZ
 UT 00    06    12    18    24
```

East - North Africa

```
28.5       ...
24.9      ..%..
21.2     .%%%%%..          .
18.1 .....%FFFF%.........  %..
14.2 %%%AA        A%%%%%%.%F%%
10.1                  FFFFFF
 7.2                   FFFF
 3.6                   FFFF
 1.8                   FFFF
 0.9                   FFFF
 MHZ
 UT 00    06    12    18    24
```

East - West Africa (short path)

```
28.5
24.9 ..      .               .
21.2 %..    .%..            %%
18.1 %%..   FF%..          .F%
14.2 FF%%...FFFA   A       FFF
10.1                   %%.%F
 7.2                   AFFF
 3.6                    FFF
 1.8                    FFF
 0.9                    FFF
 MHZ
 UT 00    06    12    18    24
```

East - West Africa (long path)

```
28.5         .            .
24.9         ..           %.
21.2        .%......     .%%.
18.1 .......%%%........  %F%%.
14.2    A%%%FFF%A    AA..AA
10.1       AF
 7.2        F
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

East - South Africa

```
28.5        ..
24.9       %%%.
21.2      %SMM%..
18.1     %SSMMM%..
14.2     MSSMMMMMM%...
10.1               MMMMMM%M%A
 7.2                MMMMMMMM
 3.6                MMMMMMMM
 1.8                MMMMMMM
 0.9                MMMMMMM
 MHZ
 UT 00    06    12    18    24
```

forecaster Aug 1993

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%	This frequency/time pair should allow communications on between 50% and 90% of the days of the month.
F	Your best bet: first 'F' mode conditions should apply on at least 90% of days this month for the given time and frequency.
E	Propagation via the 'E layer' expected on up to 90% of days of the month at this time and frequency.
P	A fair mixture: up to 90% chance of a path using 'F mode' and between 50% and 90% probability of an 'E layer' path.
B	A good mixture: up to 90% chance of a path using either 'E layer' or mixed 'F' modes.
M	A mixture of combined 'F' modes — both first and second mode up to 90% of the time.
S	Second 'F' mode conditions should apply on at least 90% of days this month for the given time and frequency.
A	High atmospheric absorption of the signal is likely — better to use a higher band. Too close to the ALF for good HF signals.
X	A complex mixture of modes is likely to apply and could possibly include the second 'E' mode.

West - England (short path)

```
28.5
24.9       .......
21.2      ..%%%%%...
18.1     .%%%FFFF%........
14.2 %%%%A      AA%%%%%%%....%
10.1 F                FFF%%%FF
 7.2                   FFFFFF
 3.6                   FFFFFF
 1.8                   FFFFFF
 0.9                   FFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - England (long path)

```
28.5
24.9
21.2         ....           .
18.1 .      .%%%..          %.
14.2 %%%....%FFF%AAA       .F%
10.1
 7.2
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

West - central and east coast USA

```
28.5
24.9 ...                 .....
21.2 %%%.                %%%%%
18.1 FF%%..      ......  FFFFF
14.2  AFF%%%%....%%%%A
10.1       FFFFFFF
 7.2        FFFFF
 3.6        FFFFF
 1.8        FFFFF
 0.9        FFFFF
 MHZ
 UT 00    06    12    18    24
```

West - west coast USA

```
28.5   ...
24.9 ...%%.                 ..
21.2 %%%%%%..              .%%
18.1 FFFFF%%%...........   %FF
14.2    AAFFF%%%%%%%%%%%A
10.1         AFFFFFFF
 7.2          FFFFFF
 3.6          FFFFFF
 1.8          FFFFFF
 0.9          FFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - South America

```
28.5
24.9  ..
21.2  ...
18.1 .%%%.....               .
14.2 %FFF%%%%%. %..          %
10.1 FF      FF%FF        ..%F
 7.2 F        FFF          FFF
 3.6          FFF          FF
 1.8          FFF          FF
 0.9          FFF          FF
 MHZ
 UT 00    06    12    18    24
```

West - West Indies

```
28.5   .
24.9 .%.......               .
21.2 %%%%%%%....            .%
18.1 FFF%%%%%%....          %F
14.2 FFFFFFFF%%%%%..A      .FF
10.1         FFFFF
 7.2          FFF
 3.6          FFF
 1.8          FFF
 0.9          FFF
 MHZ
 UT 00    06    12    18    24
```

West - Japan

```
28.5   .........
24.9 ....%%%%.... .         ..
21.2 %%%%SS%%%%%....        %%
18.1 SSSSSSSSSS%%.%%....    SS
14.2 SSSSSSSSSSSS%MM%%%%....SS
10.1          SSSSMMSSSS%%%
 7.2           SSSMMSSSSSS
 3.6           SSSMMSSSSSS
 1.8           SSSMMSSSSSS
 0.9           SSSMMSSSSSS
 MHZ
 UT 00    06    12    18    24
```

West - central Europe

```
28.5
24.9       .......
21.2     ..%%%%%%...
18.1    .%%%FFFFF%........
14.2 %%%%A     AAF%%%%%%%....%
10.1 F               FFFF%%%FF
 7.2                  FFFFFFF
 3.6                  FFFFFFF
 1.8                  FFFFFFF
 0.9                  FFFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - Middle East

```
28.5   .....%.....
24.9   .%%%%%%%%%..
21.2  .%MMMMMMMMM%...
18.1 ..MMMMMMMMMM%%.......   .
14.2 %MMMMSSSSSMMMMM%%%%%%...%
10.1 M            AMMMMMMMMMMM
 7.2               MMMMMMMMMM
 3.6                MMMMMMMMM
 1.8                MMMMMMMMM
 0.9                MMMMMMMMM
 MHZ
 UT 00    06    12    18    24
```

West - North Africa

```
28.5       ... ..
24.9      .%%..%..
21.2     .%%%%%%%..
18.1 .....%FFFFFF%...        .
14.2 %%%%FA       A%%........%
10.1 F                FFFF%%FF
 7.2                   FFFFFF
 3.6                   FFFFFF
 1.8                   FFFFFF
 0.9                   FFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - West Africa (short path)

```
28.5         ...
24.9        %%%%..
21.2  ...   FFFF%.
18.1 .%... .FFFFF%..         .
14.2 FF%%%.%FFAA   A.......  F
10.1 FA                %%%%%%F
 7.2 F                 FFFFFFF
 3.6 F                 FFFFFFF
 1.8                   FFFFFF
 0.9                   FFFFFF
 MHZ
 UT 00    06    12    18    24
```

West - West Africa (long path)

```
28.5          .
24.9         ...
21.2         %%..          ..
18.1 ........FF%.........  %%.
14.2    A%%.%FFFA
10.1         A
 7.2
 3.6
 1.8
 0.9
 MHZ
 UT 00    06    12    18    24
```

West - South Africa

```
28.5       ....
24.9      .%%%%..
21.2      %MMMMF%.
18.1     .MMMMMM%%.
14.2     FMMMMMMMM%...
10.1 %. A        ASMMM%%%%%%%%
 7.2 M              MMMMMMMMMM
 3.6                MMMMMMMMM
 1.8                MMMMMMMMM
 0.9                MMMMMMMMM
 MHZ
 UT 00    06    12    18    24
```

ARA 16/3 ☞

Feel free to send us a photocopy of this form but you *must* include this **original** corner flash with your copy.

amateur radio action

Readers of **Amateur Radio Action** may use the **ARA CLASSIFIEDS** column to the extent of 25 words absolutely *free!* This offer applies only to *private* 'For Sale' or 'Wanted' classified listings, and to computers, software or computer peripherals with an amateur application. A **limit of one** classified advertisement applies to each advertiser. Any additional words must be paid for or the advertisement **will not be accepted**

A nominal fee of $4 per additional 25 words or part thereof will apply. This fee should accompany your material. Please enclose this fee or your advertisement will not appear. Preference is given to paid advertisements, and we receive an awful lot of them each month...

Your advertisement's inclusion cannot be guaranteed, but every effort will be made to place your advertisement in the issue following receipt of copy. The 25 words *must* include your name, callsign and phone number.

The publisher reserves the right to amend or reject any advertising material considered unsuitable for publication. No correspondence will be entered into.

Repeat **ARA CLASSIFIEDS** advertisements will be accepted for a fee of $4 for *every* 25 words—*including* the first 25. Once again, this fee should accompany your material.

Free advertisements for **commercial goods or services** will not be accepted for publication in these Classifieds pages. Instead, special rates apply for commercial advertising material which appears in the display pages of **Amateur Radio Action**. For details of display advertising phone Grant Manson on (03) 601 4240.

Readers should note that all advertisements are required to comply with the provisions of the Victorian Consumer Affairs Act of 1972. They should be aware that, under the above Act, Post Office box numbers can be published *only* if the full name and residential address of the box holder is supplied with the advertising material.

This form is to be used for all classified advertising material in **Amateur Radio Action**. Letters on plain paper requesting the insertion of a classified advertisement will not be accepted without an original corner flash from an issue not more than three months old. Photocopy or clip this form and post it ***with the corner flash*** to:

Amateur Radio Action Classifieds,
GPO Box 628E,
Melbourne 3001

IMPORTANT NOTICE Unsuitable material includes unsigned advertisements, advertisements for wanted amateur transmitting equipment where no call sign is shown, sale equipment modified for general coverage transmit, non-amateur transmitting equipment (including CBs) or equipment modified for use on CB, marine or other non-amateur bands.

You may fax your classified to (03) 670 9096 *only* if under 25 words.

Next issue's deadline: July 23

FREE						FREE
PAY $4						PAY

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Your name: __________ *Call sign (if any):* **VK** ______

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Your signature: __________ *Today's date:* / /

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...CLASSIFIEDS ... CLASSIFIEDS ... CLASSIFIEDS...

VK2 AREA

Altron 3-el mini-beam 6-10-15-20M, 3M boom length compl with spare set coils, full insts $295. Stan, VK2DHS (02) 349 3741

Amateur Radio classes Wednesdays 7pm, Campbelltown High School. Exams third Sunday each month. Come & join the fun. Les, (046) 28 3839, Dave, VK2GDM (046) 27 1025

Antennas: 2M 8-el & 70cm 19-el beams with rotator, all good cond. The lot $285. **Tokyo** 25w 70cm amp $95. Stuart, VK2KZX (02) 948 5134. Transmitting gear sold to licensed amateurs only.

BWD 10MHz CRO valve model 502 with books & probes, good $150. New HF **SWR** bridge 19" rack mount, nice unit. $40. Bruce, VK2NSE (067) 46 1745

Eimac SK-800B socket SK-806 chimney in new cond. **Eimac** ceramic HCX1500B, have both new & used. **Jennings** vacuum relay; & 50Ω 100w dummy load. Ron, VK2DTR (02) 918 3835

Hy-Gain HF vert ant. (20/15/10M) EC. **Also** HF 1500W o/p linear, 80-10M, with 3 spare 3-500Z tubes. Mark, VK2GND PO Box 1609, Hornsby, NSW 2077. Transmitting gear sold to licensed amateurs only.

Kenwood TR-2600 2M port xcvr, **Icom** RM-3 remote controller, self supporting 70' tower, 80/40/20 trap dipole, 2M mobile whips, slide mount, plus many accss. Tony, VK2XTJ (02) 708 2045. Transmitting gear sold to licensed amateurs only.

Oskerblock SWR-435 UHF wattmeter $130. Richard, VK2ERF (042) 96 9869

Realistic HTX-100 10M SSB/CW mobile xcvr, as new $200. **Yaesu** FT-620 6M xcvr plus VC-75 voice controller & hbks $200. Will swap for CRO with cash adjust or RF sig gen & GDO. Rick, VK2XRB (047) 51 2847. Lic amateurs only.

CAVEAT EMPTOR — BUYER BEWARE

The acceptance of classified advertisements in the Amateur Radio Action classified advertising section does not warrant in any way that the goods offered are available, free of any encumbrance, in working order or otherwise satisfactory. The purchase of goods by private sale does not offer the purchaser any protection under law, and buyers should be certain the goods under consideration are suitable for the purpose for which they are required. Amateur Radio Action cannot accept any responsibility for goods advertised in the classified pages and no correspondence will be entered into regarding such goods.

The onus is on you...

Tubes: 4CX250B unused, 1 pair Eimac, 1 pair National, plus 2 neutralised sockets. Tubes $120ea, sockets $70ea or $600 the lot. Eric, VK2EED (02) 634 1462 A/H, (02) 562 3709 B/H

Wanted watt meter suit two metres. Richard, VK2ERF (042) 96 9869

Wanted: Heavy duty rotator, cash or trade Icom IC-20 & Realistic HTX-100. Eddie, VK2KS (02) 484 9846

Wanted: Kenwood AT-180 ATU. Must be in good working order & cond. Barry, VK2BJ (02) 449 1672

Wanted: Kenwood R-5000 comms rcvr GC with manual. David (047) 54 1753

Wanted: Morse Code program to suit C-64. Disk or tape okay. Glenn, VK2JGB (02) 796 7140

Wanted: Tilt-over mast, rotator, HF beam, HF xcvr. Malcolm, VK2BMS (02) 257 4583 B/H, (02) 958 1114 A/H

Wanted: Yaesu FV-102DM VFO & FC-102 ATU. 'Smithy', VK2UH (048) 40 2228, or write 'Koorawatha', Thralga 2580

Yaesu FT-757GX mkII all-mode base/mob all-band HF xcvr, 100W output, as new $1150 **GME** 35 amp 13.8VDC pwr supp $325, new. James, VK2DXM (02) 622 6268 A/H or (02) 626 6270 B/H. Transmitting gear sold to licensed amateurs only.

VK3 AREA

ATN 9-el log periodic Yagi, covers 13-30MHz, stainless hardware with four cables, anti-sway brace, ATN balun included. Transport buyer's responsibility. Half new price $575. Morrison, VK3BCY (056) 89 1205, (018) 17 8455

Bencher lambic paddle with shielded lead & plug for direct keying into any modern xcvr. As new cond $95. Roth, VK3BGG (03) 725 3550

Collins ARC-51X UHF xcvr 200-400MHz cont, hbk $145. **Collins** 860E-2 dist meas equip 1000MHz, hbk $120. **Collins** 51X2 VHF rcvr 108-136 MHz $125. Also R/390/1 parts. David, VK3BFB (03) 587 1593. Licensed amateurs only.

Collins KWM-1 xcvr VGC incl Collins DC pwr supp unit, orig hbk etc $475. Rob, VK3JE (060) 37 1262 or (03) 584 5737. Licensed amateurs only.

WEATHER FAX PROGRAMS

RADFAX2 is a high resolution shortwave weather fax receiving, displaying & printing program for the IBM XT or AT computer with a CGA, EGA, VGA or Hercules card (please state which). Programs are $35 each plus $3 postage, and are supplied on 5.25" or 3.5" disk (please state which) plus full documentation. Programs are available only from: M Delahunty, 42 Villiers St, New Farm, Queensland 4005. Phone (07) 358 2785

Also **SATFAX** vers 5.0, (EGA & VGA) $45, & **MAXISAT** (1024X768X16/256 SVGA) $75 which are weather satellite picture receiving & displaying programs — add $3 P&H.

Hy-Gain TH-3 triband beam, 20/15/10M, heavy duty with balun & mounting brkt, GC $180. Dieter, VK3BGI (052) 78 3799

Icom IC-751A HF xcvr plus workshop manual $1750. **Yaesu** FT-7 HF xcvr $450. **Commodore** C-64 disk system, with Packet, CW, Amtor software & modem, plus support software. Ron, VK3AEO (03) 707 3405. Transmitting gear sold to licensed amateurs only.

Icom IC-R7000 comms rcvr 25-2000MHz, VGC comp with op & svce manuals $1200. Barry, VK3RI (059) 75 4169

Icom IC-R7000 VHF/UHF scanning comms rcvr with TV-R7000 video adaptor, VGC $1200. John (058) 21 0726

Icom IC-R71 comms rcvr with IC-EX309 computer interface & RC11 remote control fitted, FL-44A filter, inst manual VGC $900 ono. Rob, L36151 (050) 23 1272 (0800-1500k)

Kenwood RC-10 multi-function handset-style remote controller, suit most Kenwood VHF/UHF mobiles, with orig books & pack. Mint cond, hardly used, comes with extra cable $400. Joe, VK3TJA (03) 331 0517

Kenwood TH-405A UHF HT GC $275 ono. Brian, VK3SVO (03) 726 9198. Licensed amateurs only.

Kenwood TL-922 linear amp VGC $1000. **Emtron** EAT-2000 ant tuner $400 & **Arlec** 5A 12V reg pwr supp $80. Brian, VK3HB (059) 74 3425. Transmitting gear sold to licensed amateurs only.

Kenwood TM-741A FM tribander with 6m band option. With all options & docs, incl duplexer, $1300. Would like to trade to TS-940S. David, VK3HZ (03) 665 8877 24 hours. Lic amateurs only.

Kenwood TS-700SP 2M all-mode xcvr with mtchg VFO $550. **Pakratt** 64 with C-64, monitor, disk drive $350.

... CLASSIFIEDS ... CLASSIFIEDS ... CLASSIFIEDS...

Welz 2M & 70cm SWR/pwr meter $110. **Revex** 1.8-60MHz SWR/power meter $160. Roy, VK3YHF (054) 39 7488. Transmitting gear sold to licensed amateurs only.

Kenwood TS-811A 70cm xcvr with manuals $500. **Kenwood** TS-711A 2M xcvr $500. **Tokyo Hy-Power** HL-160 V25 2M all-mode linear $200. **Emtron** EAT-300A ATU $180. **Mirage** 6M 10W in, 150W out linear $300. **Icom** WR-2000 SWR/pwr meter $50. **Icom** WR-2000 SWR/pwr meter $80. **Emtron** EDM-1 grid dip meter $50. All items in near-new cond. Must sell; moving to retirement village. Will sell the lot for $1500. A bargain at this price. *(Indeed it is! Ed.)* Bob, VK3EJQ (053) 92 2276. Licensed amateurs only.

Kenwood TS-950SD HF xcvr, with orig pckg, manuals, in GC $4600. **Kenwood** TS-940S HF xcvr complete with tech & svce manuals, mint cond $2400. **MFJ**-1278T multi-mode TNC, in mint cond $500. Ross, VK3TLR (03) 762 1828 A/H (03) 729 7656 B/H. Licensed amateurs only.

Linear Amp CVS-50J, 10-32MHz. 5W in 20W out, AM, SSB, FM new in box $85. **BWD**-509A single-beam 5MHz CRO, fitted with new CRT, comp with leads & svce manual, in VGC $120. **Kenwood** MB-201 twin mobile bckt, holds 2 radios, new in box $50. **Tektronix** RM-527 broadcast waveform monitor, recalibrated with svce manual, in VGC. Ideal for ATV $1200. Apple Macintosh video display radiation & anti-glare shield. Suit Mac 128, 512, SE or Classic. New in box $90. David, VK3THY (03) 434 7152

Linear amp: HF home-brew for 20 & 15M bands, grounded grid, 500W out from 70W in, built by VK3ZL, hardly used $380. Damian, VK3EHP (053) 52 4183. Licensed amateurs only.

QSL CARDS

QSL cards, white or colored, pre-printed or fully personalised with callsign, operator's name, QTH, station equipment, QSO panel, with or without logo. Top quality cards at best prices — eg. 200 fully-personalised cards for just $38.40.

Send a 90¢ stamp to **BINT Services**, PO Box 323, Cheltenham 3192 for samples and prices.

LNCs for Aussat reception, Transbeam & Maspro, approx 1.5dB noise fig $30ea. Feed horn to suit $15. Neil, VK3BCU (03) 390 2609

Philips 828 mkII for 2m $100. 2M power divider, UHF conns $40, new. Linear transverter, **Microwave Modules** 144-146 MHz in, 1296-1298 MHz out, SSB FM CW 15 dB ATT $250. Diplexer on 160MHz $150. Bob, VK3DEP (050) 25 7418. Transmitting gear sold to licensed amateurs only.

Tokyo Hy-power HL-2K 160-10M linear amp, includes WARC bands, 2kW input with pair 3-500Zs, little used, manual pack, $2200 ono. Michael, VK3OX (059) 79 1995. Licensed amateurs only.

Wanted very urgently: Kenpro KR-500 elevation rotator to complete satellite station. I've spent 12 mths looking! Please help. Theo, VK3CTK (03) 543 3517 A/H, (03) 543 8777 B/H

Wanted: Icom IC-475A/H multi-mode UHF base with or without CT-16 sat interface. Adam, VK3ALM (03) 794 7873 *(Congrats on the new call, Adam. But you should be looking for an HF rig! Ed.)*

Wanted: photocopy of electronic Morse keyer from *Electronics Australia* March 1978, all costs paid. Max Martin, VK3VSM, 8 Taylor Ave, Reservoir or (03) 470 1968

Wanted: RTTY modem with variable speed, plus space & loop supply. To suit HF-UHF. David Stevens, 15 Isobella Street, West Geelong 3218

Wanted: Yaesu FT-680R 6M all-mode xcvr in GC. Steve VK3TSR (059) 64 7742 or (018) 10 3487

Yaesu FL-2100B HF linear, spotless $500. **Also** Home-brew beautifully-built band-switched HF xmtr, matching linear, multi-aerial switch & relay $600. Don, VK3ADI (03) 858 5593. Lic amateurs only.

AUSTRALIAN QSL SERVICE

A service for *all* amateurs. Your outward QSLs handled & an inwards QSL manager service for only $10 per year & small charge per outward cards. Special rate for clubs. Further details contact John Gough, VK5QD, 51 Mildred St, Kapunda SA 5373 with SASE or phone (085) 66 2335

PAY TV...

Pay TV & Satellite Scrambling News monthly, with the latest on descrambling techniques. Find out where to buy the latest descramblers. Send 45¢ stamp for info. John Papp, PO Box 37885 Winnellie, NT 0821

QSL CARD COLLECTION

Please make your donation of QSL cards to the Wireless Institute of Australia QSL collection and save something for the future. Also, if helping a silent key estate please contact Ken, VK3TL, 4 Sunrise Hill Rd, Montrose 3765, or phone (03) 728 5350. Arrangements can be made for large quantities of cards. Can you spare a few?

Yaesu FT-107M HF xcvr with pwr supp, mem board, WARC bands $695. **Yaesu** FV-107 ext VFO $85. **Icom** IC-726 HF+6m xcvr $1195. Paul, VK3AJJ (03) 659 7828 B/H, (03) 722 1076 B/H. Licensed amateurs only.

Yaesu FT-212RH 2M FM xcvr with **Kantronics** KPC-3 packet controller, both 3mths old. With 2M 1/2 wave antenna, mast, pwr supp, software etc. The ideal packet system. The lot $700 ono. Barry, VK3VZZ (03) 434 6907. Licensed amateurs only.

Yaesu FT-901D HF xcvr, 5-el beam, ½ wave vert, Yaesu FC-902 tuner, dummy load, KR-400 rotator, 55' RG-8, 35' tower $1500 ono the lot. Dean, VK3XFE (018) 57 6347. Licensed amateurs only.

VK4 AREA

Icom IC-251A 2M all-mode xcvr $550. **Hidaka** trap vert, 80-10M $55. Bryan, VK4KWB (07) 288 3325. Transmitting gear sold to lic amateurs only.

Kenwood CD-10 callsign disp with AC adaptor & card to connect to car batt for mobile op. Glen (07) 279 2312

Kenwood TS-520S HF xcvr, 200W PEP o/p, with mic, little use, orig carton, plus manual. $500 Trevior, VK4ARB (07) 269 8848. Lic amateurs only.

Kenwood TS-850S latest HF xcvr, **Kenwood** DSP-100 digital signal processor, **Kenwood** AT-230 tuner, **NEC** pwr supp (13.8V 30A cont), **Cushcraft** vert triband ant, all in top class cond, the lot $4000. Mick, VK4KCF (07) 284 7739. Lic amateurs only.

All phone numbers are after hours unless otherwise noted.

Please do NOT quote PO Box numbers without supplying your full residential address. This is the LAW.

Kenwood TS-940S HF xcvr, with auto ATU, MC-60 mic, manuals. Immac $1900. Will cons TS-140S, TS-430S or sim trade. VK4AE (074) 43 4848. Lic amateurs only.

Modem Bit Blitzer 1200/300 PC internal $50. New **6146** transmitting valves $12ea. 2BPI **CRT** $25. 240-115V 500VA mains tyransformer, best offer. Ron, VK4BL (070) 55 0230

Wanted: Cathode ray tube single gun Hitachi 5uPIF or equiv for BD 509B CRO. John, VK4TL (070) 96 8328

Wanted: HF transmitters, rcvrs, xcvrs, amps... valve models 1960-75, basket cases or not. Home-brew also cons. 'Doc' VK4CMY (076) 61 6200 B/H, (076) 85 2167 A/H. On behalf of *Granite Belt Amateur Radio Group*

Wanted: manual to borrow for Kenwood TS-690S or TF-450S. Will pay for post & return in one week. Want to read only (won't photocopy — really I won't!). Jonathon, VK4DJD (07) 343 6888

Wanted: Manual, circuit diagram or any info for Philips valve/CRO GM5655. Peter, VK4FV (075) 37 4411

Wanted: Philips FM-321 70cm xcvr, cheap, also 23cm gear. Bryan, VK4KWB (07) 288 3325

Yaesu FT-707 HF xcvr, FV-707 ext VFO, scanning mic, mobile mount, VGC, orig cartons $750 ono. Phil, VK4NXZ (074) 46 2369. Licensed amateurs only.

VK5 AREA

Collins 75S-3 rcvr, 516F pwr supp, 32S-1 xmtr, fully realigned, new tubes, with lots of spares incl four 6146Bs. Make an offer or swap for IC-720A or sim. Norm, VK5GI (08) 338 1815. Licensed amateurs only.

Commodore SX-64 port computer with built-in color screen, 5 1/4" FDD, packet modem & software. VGC $400 incl post or freight. Ben, VK5GX (08) 295 5197

JRC NRD-515 all-mode rcvr, dig readout 0-30MHz, comes with memory module & ATU, all in GC $900. Chris (08) 296 8424

Realistic AX-190 comms rcvr 3.5-29.5MHz, in as-new cond $100. **Telegraphic** Morse unit, mains-powered finger thump operation $100. **Hardiflax** photocopier, A1 cond with approx 6000 sheets copying paper $250. Jim (088) 37 3683

Wanted: Drake R-4C comms rx, must be in good cond, no mods, prefer with CW filt. Bob, VK5MV (087) 25 1455

Wanted: Kenwood MC-60A desk mic, must be in EC. Also wanted: two mounting bases & springs to suit Terlin HF antenna, also in GC. Paul, VK5MAP (086) 51 2398

VK6 AREA

Wanted: valves 805, 838, 4EZ7, 845, 810 or sim. P Lawrence (09) 272 6483

Kenwood TS-440S with SSB filt, auto ATU, mic plus MC-80 base mic, service manuals, in orig box $1785. Bill, VK6WJH (097) 34 4374. Licensed amateurs only.

Wanted: Eimac 3-500Z valves (pair), pref as new. *Also* Kenwood PS-30 DC pwr supp to suit TS-130S. Steve, VK6VZ (09) 349 9703

Collins 30S1 in absolute mint cond plus two spare tubes $3800. Norm, VK6NS (09) 367 6128. Licensed amateurs only.

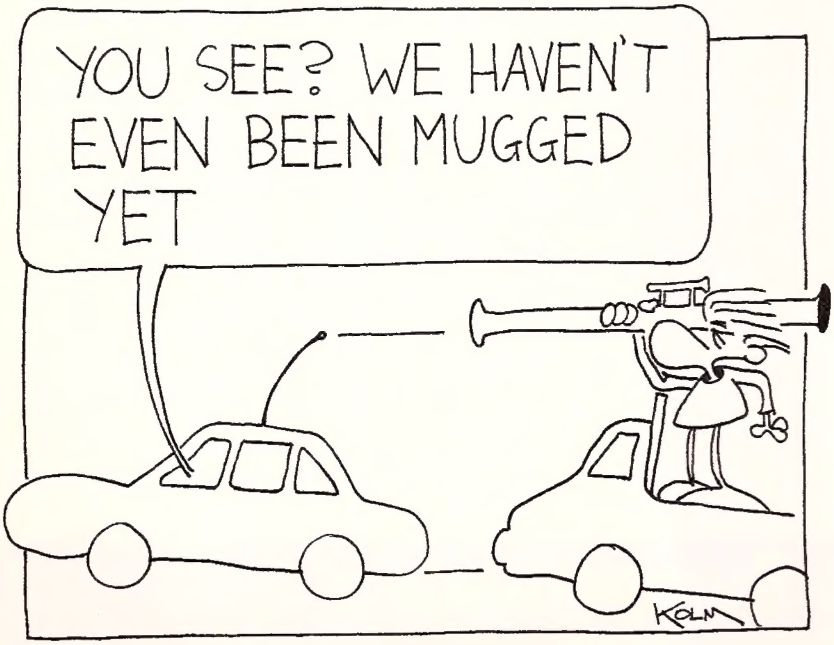
Wanted: Datong Morse Tutor in GWO. Dave West, 46 St Andrews Dve, Yancher 6035 or (09) 561 2311

VK7 AREA

Wanted: two Kenwood TU-5 CTCSS tone units to suit TS-711A & TS-811A xcvrs, must be genuine parts. David, VK7ZDJ (004) 25 2030

VK8 AREA

Kenwood TS-700A 2M all-mode xcvr $400 **PacComm** HandiPacket mini-TNC with full mailbox $375. **Cushcraft** 147 20T SSB/FM beam, new in box $125. Steve, VK8SO (089) 53 1527. Transmitting gear sold to licensed amateurs only.


YOU SEE? WE HAVEN'T EVEN BEEN MUGGED YET
KOLM

Listed below is everything most people know about MS.

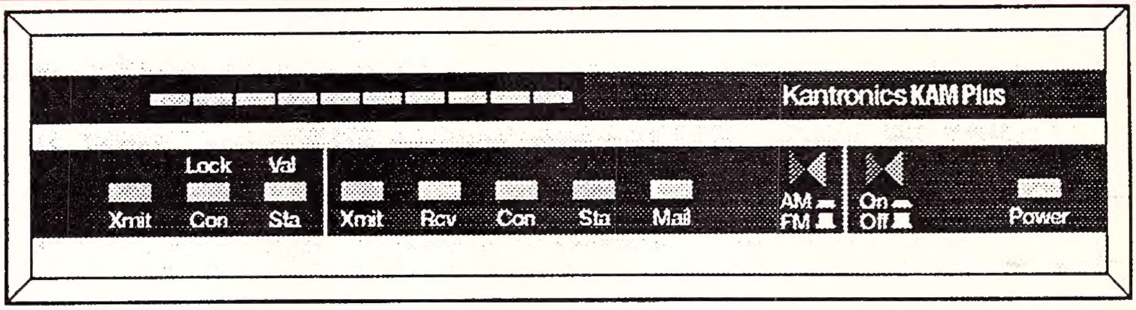
MS

For information about multiple sclerosis please contact the MS Society.

NEW from Kantronics!

KAM Plus™

$699



ACTUAL SIZE

The **NEW** Kantronics All Mode Plus (**KAM Plus**), an enhanced version of the industry-standard KAM, byte-packed with new hardware and firmware features, will be the unit of choice for discriminating amateurs demanding high performance and flexibility of operation.

New features standard in the **KAM Plus** include 128K bytes of RAM, a 1 megabit EPROM, socketed lithium battery, on-board clock, the new Pactor mode, new-user/expert command sets, extended RTTY and AMTOR character sets, an on-line help message for each command and enhanced CW (Farnsworth spacing, weighting and tone transmission). Outstanding KAM features retained in the **KAM Plus** include simultaneous HF/VHF operation and Host Master split-screen software compatibility.

With two radio ports, the **KAM Plus** supports CW, RTTY, ASCII, NAVTEX/AMTEX, AMTOR (ARQ, FEC, SELFEC, CCIR 476 and 625), Pactor and Packet on HF while running Packet on VHF at the same time. **KAM Plus** runs in terminal, KISS or HOST modes. Simultaneous multi-mode operation, such as RTTY on HF and packet on VHF, is supported with Host Master multiple windows programs for PC compatibles, C-64 and Macintosh. **KAM Plus** also supports KA-Node networking and an HF/VHF packet gateway function.

KAM Plus features include:

- A large personal mailbox, configurable to more than 100K bytes and accessible via AMTOR, Pactor or Packet
- 128K RAM space expandable to 512K
- Enhanced CW operation.
- CW transmitted by tone now included.
- **Pactor standard in the firmware.**
- RS232/TTL serial i/ace, compatible with PC, Mac or C-64
- Programmable Mark and Space tones, CW filter bandwidth and center frequency
- 12-pole switched capacitance filter for HF port
- Size: 1-3/4 by 6 by 9 inches (4.5 by 15.3 by 23 cm)
- Weight: 1.1 Kg
- Power: nominally 12 VDC @ <300 ma.
- One year warranty. Made in the U.S.A.

KAM Enhancement Board™ $159.95

Kantronics is proud to announce the **KAM Enhancement Board**. This board provides **KAM** users with the same functionality featured in the new Kantronics **KAM Plus**. The Enhancement Board fits easily within the **KAM** case, plugging into the EPROM and RAM sockets.

Many optional features for the KAM are now standard in the Enhancement Board:

- Pactor
- on-board real-time clock
- battery-backed RAM

NEW hardware and firmware features have also been added, most significantly, the expansion of RAM space to 128K bytes and EPROM space to 1 Megabits. This enlarged RAM creates about 100K of personal mailbox space! The increased EPROM space makes possible the additional firmware features listed below and provides room for future expansion.

New hardware features:

- 128K bytes of RAM
- EPROM space expanded to 1 Megabits
- replaceable lithium battery, used for clock and RAM backup

New firmware additions:

- new-user and expert command sets
- enhanced mailbox command set
- extended RTTY & AMTOR character sets
- on-line help messages for each command
- enhanced CW: Farnsworth, weighting, tone transmitted CW

Pactor is the newest digital mode for HF data communications used world-wide in the amateur community. Coded by Kantronics for the **KAM** and **KAM Plus**, in conjunction with the German inventors (SCS), Pactor combines variable speed, Huffman data compression, a modified ARQ protocol, and a 16-bit CRC code with framed data. The result is error-free communication with a high data throughput.

For beginners, a new-user command set has been added. Newcomers encounter 30 simple commands, making initial operation in RTTY, AMTOR, Pactor, or packet straightforward. Users may switch to the full KAM command set at any time. As an aid to operators, on-line help messages are available for all commands. To display a help message, the user types H followed by the command.

For the advanced CW operator or code student, we've added Farnsworth spacing which provides time between characters and dash/dot weighting. These techniques aid in code reception and the learning of Morse code. With 'tone CW,' the KAM can now be used to drive an audio amplifier and speaker or a 2-meter radio for code practice!

For KAMs with version 5.0 or 6.0 (Pactor) firmware installed, no additional manuals are necessary. The addendum manual, which is shipped with the Enhancement Board, includes installation and new firmware documentation. For KAMs at version 4.0 or below, we highly recommend the additional purchase of the KAM *Commands and Operations Manuals*. For KAMs below version 2.85, we recommend purchasing the KAM three-volume set.

Modem restrictions: The modem disconnect header is used by the Enhancement Board and is therefore not available for Kantronics add-on modems.

Stewart Electronic Components Pty. Ltd.

Phone (03)543-3733
FAX (03)543-7238

44 Stafford Street Huntingdale : PO Box 281 Oakleigh 3166

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MFJ Antenna Tuners MFJ

If you want nothing less than the best, then MFJ tuners are for you, using only the highest quality components, many of which are made EXCLUSIVELY for MFJ!

1.5kW Tapped inductor — The 'Basic' High power tuner

The **MFJ962C 1.5kW tuner** is the answer to all those situations where a 300W tuner just isn't enough. If you are operating a linear at the legal limit then the MFJ962C is for you. A high quality, high inductance, tapped inductor is combined with two continuously variable capacitors to provide the widest possible matching range at frequencies from **1.8 to 30MHz**. Why settle for a 300 watt tuner when, for only a little more, the **MFJ962C** can grace your operating bench?

- Widest possible matching range for lowest possible SWR!
- Peak reading power and SWR meter with two ranges
- Illuminated meter (uses 12V DC supply, not included)
- Extra heavy contact pressure for greatest reliability
- Covers entire 1.8-30MHz range
- 6 position antenna switch for 2 coax lines, random wire or balanced lines or external dummy load.
- Super heavy duty balun wound with Teflon wire
- Tilt stand for ease of viewing
- Compact 273W x 514H x 381D all metal case

MFJ962C 1.5kW tapped inductor **$510**

300W Deluxe tuner with dummy load and everything else!

- Full 1.8-30MHz coverage
- Peak and average reading crossed needle SWR/Power meter (can be illuminated)
- Built in 300W dummy load
- 6 position antenna switch
- 4:1 balun for balanced lines or long wires
- Full 12 month warranty

Why settle for an imitation when for only $330 you can have a genuine MFJ antenna tuner?

With a single high-Q inductor and two high quality capacitors the MFJ949E offers better matching than tuners using two inductors, yet takes up considerably less space in your operating position. In fact, it is small enough to use portable or mobile.

The built-in 300W dummy load makes tuning *sooo* easy! It helps to reduce needless QRM, protects your finals and you'll find it invaluable for testing and adjusting transceivers.

Why not join the many hundreds of satisfied MFJ949E owners in Australia, as well as the tens of thousands around the world!

MFJ949E Deluxe 300W with 'the lot' **$330**

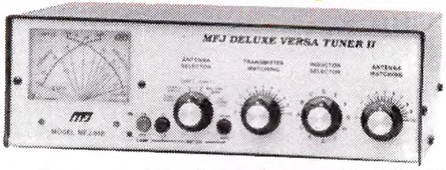
3kW Differential - T for two control convenience

The **MFJ986 Differential-T 3kW** tuner is an innovative new design suggested by Boyce Taylor, W5GZM. By using a single 'differential' capacitor a tuner has been produced which has the same quality of parts as the other MFJ tuners but with the savings of reduced component count and the added convenience of two control operation. Capable of providing an optimum match at just one setting the MFJ986 also has a new, higher directivity, directional coupler for more accurate SWR and power measurements and a new current mode balun for improved results when using balanced feed to the antenna.

- Lighted crossed needle SWR/Power meter for peak or average readings of power & SWR in two ranges.
- New, more accurate directional coupler
- New current mode balun for reduced feedline radiation
- 6 position antenna switch
- Continuous coverage from 1.8-30MHz
- Wide spaced capacitor for true 3kW rating
- High-Q roller inductor positioned for best efficiency
- Extra heavy contact pressure for greatest reliability
- 3 digit turns counter dial for inductor
- Compact 273W x 514H x 381D all metal case

MFJ986 3kW Differential - T **$660**

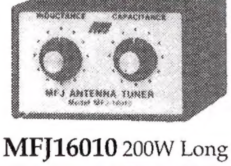
300W Deluxe tuner without the dummy load



So you would like all of the features of the MFJ949E but don't want a dummy load? Well here is the answer. The MFJ948 is identical to the MFJ949E but has no dummy load!

MFJ948 Deluxe 300W, no dummy load **$285.60**

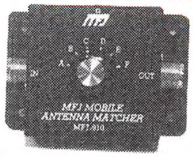
Long-wire tuner



This simple little tuner will allow you to operate just about anywhere with a random wire antenna. Matches high or low impedances, handles 200W PEP and is small enough to fit in your pocket. 50 x 75 x 50mm.

MFJ16010 200W Long wire tuner **$87.90**

Mobile antenna matcher



Help your mobile rig run better with this simple yet effective mobile antenna matcher. Measures 64 x 64 x 40mm

MFJ910 Mobile antenna matcher **$42.70**

3kW 'Deluxe' tuner with dummy load and all features

The **MFJ989C 3kW tuner** is not for everyone — quite frankly not everyone can afford it. However, if you make the investment, you will get what we believe is one of the finest 3kW tuners your money can buy.

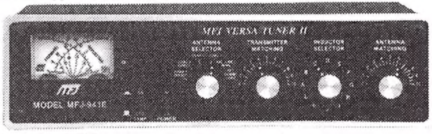
By combining 6kV rated capacitors with polished and bevelled plates and a roller inductor designed to work as well at 10 metres as it does at 20m, MFJ has produced a true masterpiece of amateur antenna tuner design. The combination of features will provide the most demanding amateur with all the matching capability he demands with a beautifully finished, all metal case.

- Widest matching range for lowest possible SWR!
- Peak reading power/SWR meter has two ranges
- Illuminated meter (uses 12V DC supply, not included)
- High-Q roller inductor positioned for best efficiency
- Extra heavy contact pressure for greatest reliability
- 3 digit turns counter dial for inductor
- 6kV rated capacitors
- Covers entire 1.8-30MHz range
- 50Ω 300W Dummy load built in
- 6 position antenna switch
- Super heavy duty balun wound with Teflon wire
- Tilt stand for ease of viewing
- Compact 273W x 514H x 381D all metal case

MFJ989C 3kW Deluxe **$769**

300W General purpose and mobile tuners

The babies have grown up! For many years the **MFJ941** and **MFJ945** tuners have been the most popular tuners *ever* sold. Now they have been given a new lease of life with the addition of **Crossed Needle SWR/Power meters**, making life easier for you now that you no longer need to adjust the SWR meter. Compare that to anything else on the market!



The **MFJ941E** is the latest version of MFJ's fastest selling tuner *ever*. With full 1.8-30MHz coverage, front panel – mounted antenna switch, 12 position tapped inductor, 4:1 balun and sturdy metal case it is no wonder this tuner is so popular. Its 267W x 73H x 178D size doesn't hurt either, making it suitable for almost any use you can think of.

MFJ941E 300W general purpose **$243**

The **MFJ945D**, with crossed needle SWR/power meter it is equally at home in the car, caravan, motel room, tent or your home station. The small, 200W x 52H x 150D, size of the MFJ945D doesn't hurt either!

MFJ945D 300W mobile tuner **$198**

Stewart Electronic Components Pty. Ltd.

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Some days Duncan thinks that he must have died and gone to heaven. Whichever way he turns he is surrounded by the finest ham radios around. What's a guy to do? He plays with them all day. And if that wasn't good enough, he gets paid for it as well.

Duncan Baxter... well VK 3LZ actually, let's call him by his 'real' name, is our resident ham radio expert. No one knows the Icom range better than VK 3LZ. He's been with us virtually from the start, some ten years in fact.

Now, if you'd like to find out about the latest in transceivers, or virtually anything else to do with amateur radio operation, why not give VK 3LZ a call. Or you could simply drop in and see him at ham heaven ... err ... our head office that is.

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